MANUAL

OF THE

FLOWERING PLANTS

OF

IOWA

PART 2. GAMOPETALAE.

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MANUAL

OF THE

FLOWERING PLANTS

OF

IOWA

BY

T. J. FITZPATRICK.
Fellow of the Iowa Academy of Sciences

pt. 2

A THESIS.

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Division 2. GAMOPETALAE: calyx and corolla usually present, the petals more or less united. Polypetalous forms occur in the Asclepiadaceae, Oleaceae, Pyrolaceae, and the Monotropaceae, and apetalous forms occur in the Oleaceae as noted at the end of the key.

A. *Stamens more numerous than the lobes of the corolla.*

Stamens free from the corolla or merely adnate to its base.
Ovary superior, 4-5-celled; fruit a cupsule.
Low evergreen perennials. PYROLACEAE, 102.
Waxy-white parasitic plants. MONOTROPACEAE, 103.
Ovary inferior, adnate to the calyx; fruit a many-seeded berry. VACCINIACEAE, 103.
Stamens borne on the tube or at the base of the corolla.
Leaves alternate. EBENACEAE, 105.
Leaves opposite and basal. ADOXACEAE, 69.

B. *Stamens as many as the lobes of the corolla and inserted on the tube opposite the lobes.* PRIMULACEAE, 104.

C *Stamens as many as the lobes of the corolla and inserted alternate with them, or fewer.*

* *Ovary inferior, adherent to the calyx-tube.*

† *Anthers united, except in Kuhnia of the Compositae, the Ambrosiaceae, and many of the Campanulaceae.*

Flowers in involucrate heads.
Flowers all ligulate; juice milky. CICHORIACEAE, 97.
Flowers tubular or the outer ligulate; juice rarely milky.
Stamens distinct or nearly so. AMBROSIACEAE, 95.
Stamens united by their anthers around the style. COMPOSITAE, 72.
Flowers not in involucrate heads. CAMPANULACEAE, 101.

† † *Stamens inserted on the corolla; anthers separate.*

Stamens in ours 3, fewer than the corolla-lobes. VALERIANACEAE, 71.
Stamens as many as the corolla-lobes, one less in *Linnaea* of the Caprifoliaceae.
Leaves opposite or verticillate, usually stipulate. RUBIACEAE, 70.
Leaves opposite, exstipulate. CAPRIFOLIACEAE, 67.

* * *Ovary superior.*

† *Corolla irregular, more or less 2-lipped; stamens 4 and didynamous, or only 2.*

‡ *Carpels 1—2-seeded.*

Ovary 4-lobed, becoming 4 1-seeded nutlets. LABIATAE, 131.
Ovary not lobed; carpels separating into 1-seeded nutlets. VERBENACEAE, 130.

‡ ‡ *Carpels 2—many-seeded.*

Ovary 1-celled; stamens 2: marsh or aquatic herbs. LENTIBULARIACEAE, 128.
Ovary 1-celled; stamens 4; brownish or whitish parasitic herbs. OROBANCHACEAE, 127.
Ovary 1 celled or becoming partially 4-celled: fruit with 2 long recurved beaks. MARTYNIACEAE, 129.
Ovary and capsule 2-celled; placentae parietal; seeds winged in our species; small trees or woody vines. BIGNONIACEAE, 128.
Ovary and capsule 2-celled; placentae axile.
Seeds usually many. SCROPHULARIACEAE, 120.
Seeds few, borne on curved projections. ACANTHACEAE, 129.

† † *Corolla somewhat irregular; stamens 5.*

Ovary deeply 4-lobed. Echium, in BORRAGINACEAE, 112.

Ovary not lobed; filaments bearded. Verbascum, in SCROPHULARIACEAE, 121.

††† *Corolla irregular.*

‡ *Stamens of the same number as the lobes of the corolla.*

Ovaries 2, separate; stigmas and sometimes the styles united.
  Filaments distinct; pollen granular. APOCYNACEAE, 106.
  Filaments monodelphous; pollen in waxy-masses. ASCLEPIADACEAE, 107.
Ovary deeply 4-lobed.
  Leaves alternate. BORRAGINACEAE, 112.
  Leaves opposite. Mentha, in LABIATAE, 133.
Ovary 1, not deeply lobed, 1-celled, 1-ovuled. PLANTAGINACEAE, 139.
Ovary 1-celled, with the ovules parietal or in 2 parietal placentae.
  Leaves opposite. GENTIANACEAE, 109.
  Leaves basal or alternate, 3-foliolate. MENYANTHACEAE, 110.
  Leaves basal or alternate, toothed, lobed, or compound. HYDROPHYLLACEAE, 111.
Ovary 2—10 celled.
  Leafless white or yellowish parasitic vines. CUSCUTACEAE, 116.
  Leaves alternate and stipulate or opposite and exstipulate; stamens inserted on the tube of the corolla.
    Stamens 4; capsule 2-celled, circumscissile. PLANTAGINACEAE, 139.
    Stamens 4; ovary 2—4 celled, becoming 2—4 1-seeded nutlets. VERBENACEAE, 130.
    Stamens usually 5.
      Fruit of 4 1-seeded nutlets, or of 2 2-seeded carpels. BORRAGINACEAE, 112.
      Fruit a few-seeded capsule.
        Calyx 5-cleft; style 3-lobed or 3-cleft. POLEMONIACEAE, 110.
        Calyx of 5 distinct sepals; styles 1 or 2, 2-cleft or entire; mostly twining vines.
          Leaves normal. CONVOLVULACEAE, 115.
          Leaves reduced to minute scales. CUSCUTACEAE, 116.
      Fruit a many-seeded capsule or berry; style solitary. SOLANACEAE, 117.

‡‡ *Stamens less in number than the lobes of the corolla.*

Stamens 4, didynamous.
  Ovary 2-celled; cells several-ovuled. ACANTHACEAE, 129.
  Ovary 2—4-celled; cells 1-ovuled. VERBENACEAE, 130.
Stamens with anthers 2; ovary 4-lobed. Lycopus, in LABIATAE, 133.
Stamens 2; ovary 2-celled.
  Herbs. Veronica, in SCROPHULARIACEAE, 124.
  Trees or shrubs. OLEACEAE, 106.

Polypetalous forms in gamopetalous families.
  Ovaries 2, separate. ASCLEPIADACEAE, 107.
  Ovary 1, compound.
    Stamens 2. rarely 3 or 4; petals 4. OLEACEAE, 106.
    Stamens in ours 8 or 10; petals 4 or 5.
      Low evergreen perennials. PYROLACEAE, 102.
      Waxy-white parasitic plants. MONOTROPACEAE, 103.
Apetalous forms in gamopetalous families.
Trees or shrubs; fruit a 1-celled 1-seeded samara or drupe. OLEACEAE, 106.

GAMOPETALAE: those with both calyx and corolla present, the latter having its petals more or less united, rarely separate or wanting.

CAPRIFOLIACEAE *Vent.* HONEYSUCKLE FAMILY.

Shrubs or herbs, with opposite exstipulate leaves, and perfect mostly 5-parted regular or irregular flowers. Calyx-tube adherent to the ovary. Corolla monopetalous, tubular, or rotate. Stamens inserted on the calyx-tube, usually of the same number as the lobes, one less in Linnaea. Style 1; stigmas 3–5. Fruit a berry, drupe, or capsule, 1–several-seeded.

Tribe **Lonicereae**. Corolla tubular, limb regular or irregular; style filiform.

* *Herbs; flowers axillary; corolla 5-lobed.*

LINNAEA. Stamens 4.
TRIOSTEUM. Stamens 5.

* * *Shrubs, erect or climbing.*

SYMPHORICARPOS. Stamens 4 5; berry 4-celled, 2-seeded.
LONICERA. Corolla tubular; stamens 5; berry 2-3-celled.
DIERVILLA Stamens 5; fruit a 2-celled, 2-valved, many-seeded capsule.

Tribe **Sambuceae**. Corolla regular, deeply 5-lobed, rotate; stigmas 3–5, mostly sessile.

SAMBUCUS. Leaves pinnate; fruit a 3-seeded berry.
VIBURNUM. Leaves simple; fruit a 1-celled, 1-seeded drupe.

LINNAEA L. A single species, creeping, evergreen, perennial. Leaves roundish, slighly crenate, petiolate. Peduncle slender, erect, 2-flowered. Calyx small, 5-parted, deciduous. Corolla campanulate, lobes 5, about equal. Stamens 4, 2 longer, inserted toward the base of the corolla. Style slightly exserted: stigma capitate.

L. borealis L. Somewhat pubescent; stems 6–30 inches long; pedicels from the axils of small branchlets; flowers nodding; corolla roseate, fragrant, about a half inch long. Moist woods; June; infrequent; Winneshiek county.

TRIOSTEUM L. Coarse perennials, with opposite ample more or less connate entire leaves, and sessile axillary flowers. Calyx-tube ovoid, limb of 5 nearly linear segments. Corolla tubular, but little exceeding the calyx, gibbous at the base, limb of 5 nearly equal lobes. Stamens 5, included. Style 1, exserted; stigma capitate, lobed. Ovary 3-celled, forming a drupe. Seeds 3, bony, ribbed.

T. perfoliatum L. *Fever-wort. Horse Gentian.* Stems 2–4 feet high, simple, soft-pubescent to hirsute; leaves oval, acuminate, contracted toward the base; flowers usually clustered, brownish purple, drupe orange color. Upland woods; May–June; common.

T. angustifolium L. Stem 2–6 feet high, hairy; leaves lanceolate, acuminate, tapering to the base, hardly connate; flowers mostly solitary, yellowish. Woods; May–July; infrequent; Johnson and Lee counties.

SYMPHORICARPOS Juss. Low branching shrubs, with opposite oval short-petioled entire leaves and small roseate axillary flowers. Calyx-tube globose, teeth 4–5, short, persistent. Corolla campanulate, limb regular, 4–5-lobed. Stamens 4–5, short, inserted in the throat of the corolla. Stigmas capitate. Fruit a globose berry, 4-celled, 2 of the cells with a single seed, the others abortive.

S. vulgaris Mx. *Indian Currant. Coral-berry.* Stems slender, 2–4 feet high; leaves nearly sessile, downy beneath; flowers in short thick clusters;

stamens and bearded style included; berries small, red. Along streams and bordering uplands; July; common but confined mostly to the southern half of the state; Lee, Henry, Jefferson, Van Buren, Wapello, Appanoose, Monroe, Decatur, Lucas, Ringgold, Union, Clark, Adams, Taylor, Page, Montgomery, Fremont, Pottawattomie, Harrison, Monona, Shelby, Ida, Woodbury, Sioux, Lyon, and Story counties. (*S. symphoricarpos* (L.) MacM.)

S. occidentalis Hook. *Wolfberry* Leaves petioled; flowers larger than those of the preceding, spicate axillary, terminal; corolla bearded within; stamens and glabrous style exserted; berries white. Upland woods; June–July; frequent; Emmet, Lyon, Dickinson, Shelby, Pottawattomie, Fremont, Page, Winnebago, Story, Fayette, and Winneshiek counties.

LONICERA L. Bushy or climbing shrubs, with opposite entire leaves, and usually showy flowers. Calyx-tube subglobose; teeth 5, very short. Corolla tubular or funnel-form; limb in 4 or 5 often unequal lobes. Stamens 5, exserted. Stigma capitate. Ovary 2–3-celled, becoming a few-seeded berry.

L. sullivantii Gray. *Honeysuckle.* Stems climbing, 3–6 feet high; leaves glabrous, often much glaucous, sessile, mostly connate-perfoliate, oval or obovate, the upper pair forming an orbicular disk; corolla pale yellow, hairy within, tube half inch long, limb shorter; filaments nearly glabrous; berries red. Woods; June; common; Winneshiek, Allamakee, Clayton, Dubuque, Fayette, Jackson, Delaware, Muscatine, Johnson, Henry, Fremont, Pottawattomie, Winnebago, Chickasaw, Cerro Gordo, and Emmet counties.

L. glauca Hill. Stems 3–4 feet high, usually bushy; leaves glabrous, less glaucous, oblong, upper pairs connate; flowers greenish yellow or purplish, tube short, limb nearly as long, hirsute within; style and base of the filaments hirsute; berries yellow. Woods; May–June; common; Winneshiek, Allamakee, Fayette, Story, and Emmet counties, specimens referred to this species have been collected in Delaware, Johnson, Cerro Gordo, Henry, and Calhoun counties. (*L. dioica* L.)

L. tartarica L. *Bush Honeysuckle.* An erect glabrous shrub, 5–10 feet high, with ovate short petioled leaves, and pinkish or whitish flowers on axillary bracted peduncles. Frequently cultivated; has been collected along the Volga river, Fayette county, probably an escape.

DIERVILLA Moench. Leaves petioled, ovate, acuminate, serrate. Flowers in axillary cymes. Calyx-tube oblong, the limb of 5 linear segments. Corolla funnel-form, nearly regular, 5-lobed, twice the length of the calyx. Stamens 5, exserted. Fruit a capsule, 2-celled, 2-valved, many-seeded.

D. trifida Moench. A small shrub, 4–6 feet high, with taper-pointed leaves, and pale yellow flowers; capsule oblong, with a slender beak, crowned with the persistent calyx-lobes. Bluff thickets; June–July; infrequent; Winneshiek, Fayette, and Muscatine counties. (*D. diervilla* (L.) MacM.)

SAMBUCUS L. Small shrubs, with simple pinnate leaves, and small cymose white flowers. Calyx-lobes small, 5 or none. Corolla-limb 5-cleft, spreading, segments obtuse. Stamens 5. Stigmas 3. Fruit a pulpy berry, 3-seeded.

S. canadensis L. *Common Elder.* Stems more or less woody, 4–10 feet high, with a large white pith, leaflets 5–11, ovate-oblong, acuminate, smooth; fruit dark purple. Rich soil, fields and open woods; June–July; common.

S. racemosa L. *Red-berried Elder.* Stems woody, 3–10 feet high, with a reddish-brown pith; leaflets 5–7, ovate-lanceolate, acuminate, slightly downy beneath; cymes panicled; fruit red. Woods; flowers in May, fruit ripe in

June; infrequent; Winneshiek, Clayton, Fayette, Delaware, and Scott counties. (*S. pubens* Mx.)

VIBURNUM L. Small trees or shrubs, with simple leaves, and white flowers in compound cymes. Calyx small, persistent, 5-toothed. Corolla rotate, deeply 5-lobed, segments obtuse. Stamens 5. Stigmas 1–3, sessile. Fruit a 1-celled, 1-seeded drupe. Petioles frequently minutely stipulate.

V. lentago L. *Sweet Viburnum. Sheep-berry.* Shrub or small tree, 8–30 feet high; leaves ovate, long-acuminate, closely and sharply serrate, with long margined petioles; cymes 3–5 rayed, sessile; drupes oval, half inch long, ripe in autumn, edible. Woods; May–June; frequent throughout the state.

V. prunifolium L. *Black Haw.* Similar to the preceding; leaves oval, obtuse or acutish, finely serrulate. Low woods; May–June; rare; Johnson county, reported from Humbolt county.

V. pubescens (Ait.) Pursh. *Downy-leaved Arrow-wood.* Shrub 2–3 feet high; leaves ovate to oblong-ovate, short acuminate, broadly dentate, pinnately veined, downy when young, base cordate, short-petioled or nearly sessile; drupe dark purple, oval; stone flattish, slightly 2-grooved on both surfaces. Rocky woods; May–June; infrequent; Emmet, Fayette, Johnson, Henry, Decatur, Story, and Cerro Gordo counties. A form of this species with the characteristic fruit but the petioles a half inch or more long is found in Johnson county. The forms referred to the next species may belong here.

V. dentatum L. *Arrow-wood.* A shrub, 4–10 feet high; branches slender, glabrous, gray; leaves ovate, oval or orbicular, acute or short-acuminate, coarsely dentate, both sides glabrous or pubescent in the axils of the veins beneath, base rounded or slightly cordate, petioles one-fourth of an inch to an inch long, glabrous; drupe globose-ovoid, blue, becoming blackish; stone deeply grooved on one side, rounded on the other. Woods; May–June; infrequent; forms have been referred to this species from Jackson, Delaware, Johnson, Henry, Winnebago, and Dallas counties.

V. opulus L. *Cranberry-tree. Wild Guelder-rose.* Shrub 5–12 feet high; leaves deeply 3-lobed, 3-ribbed, broadly ovate, base rounded or truncate, lobes acuminate, dentate, entire in the sinuses; petioles stipuled, and with 2 glands above; drupes globose or oval, red, acidic, stone orbicular, flat, not grooved. Woods; June–July; rather rare; Allamakee and Delaware counties, reported from Fayette county.

ADOXACEAE *Fritsch.* MOSCHATEL FAMILY.

Dwarf perennial herbs, with scaly or tuberous rootstocks, basal and opposite ternately divided leaves, and capitate cluster of greenish flowers. Calyx-limb of 3 or more teeth. Corolla rotate, 4–6-lobed. Stamens of 4–6 pairs, in the sinuses of the corolla, separate or partly united; anthers peltate, 1-celled. Style 3–5-parted. Fruit a greenish drupe, with 3–5 cartilaginous nutlets. Represented by the monotypic genus ADOXA L.

A. moschatellina L. *Musk-root. Moschatel.* Smooth, 3–5 inches high, radical leaves 1–4, ternately compound, long-petioled; cauline leaves a single pair, 3-parted or 3-cleft; flowers greenish or yellowish, 4–5 in a slender pedunculate glomerule. Rocky woods; May; rather rare; Winneshiek county, reported from Fayette and Floyd counties.

RUBIACEAE *B. Juss.* MADDER FAMILY.

Shrubs or herbs, with opposite or verticillate entire leaves. Stipules leaf-like, connecting the bases of the petioles or none. Flowers perfect but frequently of two forms in Houstonia. Calyx-tube adherent to the ovary; limb 4–5-cleft. Corolla regular, inserted upon the calyx-tube; lobes 4–5. Stamens 4–5, inserted on the corolla-tube, alternate with its lobes. Styles 1–2. Ovary 2–4-celled. Fruit a capsule, berry, or a drupe.

HOUSTONIA. Low herbs, with opposite leaves, and solitary or cymose flowers.
CEPHALANTHUS. Leaves opposite or in 3's; flowers in dense globular peduncled heads.
GALIUM. Leaves verticillate; stipules wanting; flowers cymose.

HOUSTONIA L. Low herbs. Stipules small, entire, connate with the petioles. Flowers solitary or cymose, white or bluish. Calyx 4-toothed or 4-lobed, persistent, the lobes becoming distinct in fruit. Corolla tubular, with 4 spreading lobes, longer than the calyx. Stamens 4, inserted on the throat of the corolla. Style 1; stigmas 2. Ovary 2-celled. Fruit capsular, few–several-seeded. Flowers often dimorphous, that is some flowers with exserted style and included stamens, others with included style and exserted stamens.

H. minima Beck. *Least Bluets.* Annual; stem 1–4 inches high, glabrous; radical leaves spatulate or ovate, cauline leaves ovate to linear; peduncles axillary, the earlier ones usually 1 inch long, later ones shorter; flowers violet or purple; calyx-lobes conspicuous; corolla-lobes about equalling the tube. Fields and prairies; March–May; common; Johnson county.

H. angustifolia Mx. Perennial; stems tufted, from a woody root, 4–20 inches high; leaves often fascicled, narrowly linear, 1-nerved; flowers numerous, in compact terminal cymes, white or purplish, short-pedicelled; lobes of the corolla bearded inside; capsule obovoid. Prairies; June–July; frequent; Taylor, Fremont, and Shelby counties; reported from Pottawattamie, Harrison, and Woodbury counties.

CEPHALANTHUS L. Shrubs, with white flowers in dense globose peduncled heads. Calyx-limb 4-toothed. Corolla tubular, 4-cleft. Stamens 4. Style 1, filiform, much exserted; stigma capitate; fruit dry, 2–4-celled.

C. occidentalis L. *Button-bush.* Shrub 2–10 feet high; leaves opposite or in 3's, ovate to lance-oblong, pointed, petioled; stipules small, triangular. Low grounds, along streams and swamps; July–August; frequent in the southeast quarter of the state but rarer elsewhere; Allamakee, Clayton, Clinton, Jackson, Scott, Muscatine, Louisa, Lee, Henry, Johnson, Appanoose, Story, Decatur, Page, Fremont, and Humbolt counties.

GALIUM L. Herbs, with angled stems, verticillate leaves, and cymose flowers. Calyx-limb of four small teeth. Corolla rotate, 4-cleft, valvate in the bud. Stamens 4, short. Styles 2. Fruit globular, dry or fleshy, separating into 2, 1-seeded, indehiscent carpels.

G. aparine L. Annual, stems 2–4 feet long, weak, reclining, retrorsely prickly; leaves usually in 8's, sometimes in 6's or 7's, oblanceolate to linear, mucronate, peduncles axillary, 1–2-flowered; fruit densely covered with hooked prickles. Low woods; May–August; common.

G. circaezans Mx. *Wild Liquorice.* Perennial, stem 1–2 feet high, branched, downy or smooth; leaves large, in 4's, oval or ovate-lanceolate, 3-nerved, obtuse; peduncles few-flowered; fruit nearly sessile, hispid. Rich woods; May–July; frequent; Johnson, Henry, Muscatine, Lee, Van Buren, Decatur, Fremont, and Pottawattamie counties.

G. boreale L. *Northern Bedstraw.* Perennial, stem 1–2 feet high, rigid, smooth and glabrous; leaves in 4's, linear-lanceolate, acute, 3-nerved; flowers white, numerous, in terminal panicles; fruit hispid or smooth. Low prairies and rocky woods; May–August; common; Winneshiek, Allamakee, Fayette, Jackson, Jones, Floyd, Cerro Gordo, Hancock, Emmet, Dickinson, and Lyon counties.

G. trifidum L. *Small Bedstraw.* Perennial, stem weak, decumbent or suberect, diffusely branched, retrorsely roughish on the angles; leaves mostly in 4's, sometimes in 6's, linear or oblanceolate, obtuse, margins and midrib rough; peduncles 1–7-flowered; flowers white, frequently 3-parted, pedicels capillary; fruit smooth. Wet woods; June–July; common. This species varies much. Variety PUSILLUM Gray is a small form with narrow linear leaves, in 4's, and peduncles 1–2-flowered. Variety LATIFOLIUM Torr., usually less branched; leaves in 4's, ovate, obtuse or oblanceolate; peduncles about 3-flowered; flowers 4-parted. These are the varieties given in Gray's Manual. They are not now recognized.

G. concinnum T. & G. Similar to the preceding, perennial; stem decumbent, much branched, angles scabrous; leaves all in 6's, linear, slightly pointed, 1-nerved, margins scabrous upward, peduncles filiform, 2–3 times forked; flowers small, numerous, cymose, white; fruit smooth. Dry woods; June–July; common.

G. triflorum Mx. *Sweet-scented Bedstraw.* Perennial, diffuse, procumbent or ascending; stem 1–3 feet long, weak, rough on the angles; leaves in 6's, narrowly oval or elliptical-lanceolate, cuspidate, 1-nerved, margins rough; peduncles 3-flowered; flowers greenish, pedicelled; fruit clothed with hooked bristles. Rich woods; June–July; common; Jackson, Jones, Muscatine, Johnson, Decatur, Story, Winnebago, and Emmet counties.

G. asprellum Mx. *Rough Bedstraw.* Perennial; stem diffuse, much branched, retrorsely hispid; leaves in 6's or in 4's and 5's on the branches, lanceolate, acuminate or cuspidate, margins and midrib retrorsely prickly; peduncles 2–3 times forked; flowers white; fruit smooth and glabrous. Alluvial soil; June–August; reported from Jones, Lee, Johnson, and Cerro Gordo counties, perhaps frequent.

VALERIANACEAE *Batsch.* VALERIAN FAMILY.

Herbs, with opposite exstipulate leaves, and cymose-clustered flowers. Calyx-tube adherent to the ovary; limb sometimes pappus-like. Corolla tubular or funnel-form, 4–5-lobed. Stamens inserted on the corolla tube, alternate with the lobes and usually fewer in number. Ovary inferior, 3-celled, but one cell fertile and 1-ovuled. Fruit indehiscent, with a single suspended ovule.

VALERIANA. Fruit 1-celled; calyx-lobes becoming pappus-like.
VALERIANELLA. Fruit 3-celled; calyx-lobes minute or obsolete.

VALERIANA L. Perennial herbs, with strong-scented roots, mostly pinnate leaves, and diœcious or dimorphous flowers. Calyx-limb small at first but evolving a plumose pappus as the seed develops. Corolla limb 5-lobed, nearly regular. Stamens 3. Fruit 1-celled, 1-seeded.

V. edulis Nutt. *Edible Valerian.* Stem 1–4 feet high, thick, smooth; root ample, spindle-shaped, edible; leaves densely ciliate, radical spatulate, cauline pinnately parted into 3–7 long and narrow divisions; flowers whitish,

polygamo-diœcious, in cymose clusters, disposed in a long narrow interrupted panicle. Low prairies; May–June; common; Winneshiek and Fayette counties.

VALERIANELLA Poll. Annual branched herbs, with tufted basal leaves, and terminal capitate, corymbed or panicled flowers. Calyx-limb short and toothed or obsolete. Corolla small, 5-lobed, nearly regular. Stamens 3. Fruit 3-celled, one cell 1-seeded, the others empty.

V. chenopodifolia (Pursh) DC. Stem glabrous, 1–2 feet high; lower and basal leaves spatulate, obtuse, sometimes repand, the upper oblong or lanceolate, entire, sessile; flowers in dense cymes; corolla white; fruit triangular-pyramidal, glabrous or pubescent. Moist soil; May–July; reported from Lee county by Arthur.

COMPOSITAE *Adans.* THISTLE FAMILY.

Ours herbs, with watery or resinous sap, and opposite alternate or basal exstipulate leaves. Flowers perfect, pistillate or neutral, infrequently monœcious or diœcious, few or many borne on a common receptacle which is subtended by a common involucre composed of few or many bracts arranged in one or more series. Receptacle naked or chaffy, smooth, pitted or honeycombed. Calyx-tube adherent to the ovary, the limb wanting or of bristles, teeth, scales, awns, or crown-like or cup-like and is known as the pappus. Corolla tubular, 5-lobed or 5-cleft or the marginal flowers with a strap-shaped or ligulate corolla; the heads are radiate when the ray-flowers are present, discoid when absent, the tubular are the disk-flowers. Stamens usually 5, borne on the corolla and alternate with its lobes, the anthers united into a tube which sheaths the style, syngenesious, distinct or nearly so in Kuhnia, sometimes appendaged at the apex or sagittate or tailed at the base, the pollen grains globose, rough or echinate. Ovary 1-celled, 1-ovuled; style of the fertile flowers 2-cleft, the branches various and naked or variously appendaged; stigmas marginal; style of sterile flowers usually undivided. Fruit an achene. A large family and well represented in Iowa. Some writers include the two following families with this one.

Tribe **Vernonieae.** Heads discoid; flowers tubular, perfect, never yellow; style-branches filiform or subulate; leaves alternate or scattered.

VERNONIA. With us the only genus.

Tribe **Eupatorieae.** Heads discoid; flowers tubular, perfect, never yellow; style-branches thickened upward, obtuse, minutely pubescent; leaves alternate, opposite or whorled.

EUPATORIUM. Achenes 5-angled; pappus of numerous capillary bristles; involucral bracts more than 4.

KUHNIA. Achenes 10-ribbed; involucral bracts striate-nerved; pappus strongly plumose.

LIATRIS. Achenes 10-ribbed; involucral bracts faintly striate; pappus plumose or barbellate; heads spicate or racemose.

Tribe **Astereae.** Heads radiate or discoid; style-branches of the perfect flowers flattened, with triangular appendages above; flowers often yellow; anthers not tailed at the base; leaves alternate.

GRINDELIA. Heads large; flowers fertile, many; pappus of caducous awns.

CHRYSOPSIS. Heads many-flowered; pappus double, the outer of chaffy scales, the inner of capillary bristles.

APLOPAPPUS. Heads many-flowered, radiate; pappus persistent, of many unequal bristles; achenes white-tomentose.

SOLIDAGO. Heads small, radiate, few-many-flowered, yellow, rarely white; pappus of numerous nearly equal capillary bristles.

BOLTONIA. Heads many-flowered; rays white or purplish, disk yellow; pappus of a few short bristles and 2-4 awns.

ASTER. Heads usually small, many-flowered, on leafy peduncles; rays white, blue or purple, disk yellow; involucre well imbricated, pappus simple, copious, of capillary bristles; achenes flattish.

ERIGERON. Heads many-flowered, on naked peduncles; involucre but little imbricated; pappus a single row of capillary bristles with intermixed smaller ones or with an outer pappus of scales or little bristles; achenes flattened.

Tribe **Inuleae.** Heads usually small, discoid, except in Inula where the rays are large and yellow; anthers sagittate, unappendaged above, tailed below; style-branches obtuse or truncate, naked: pappus capillary or none. Our species have the receptacle not chaffy.

ANTENNARIA. Heads diœcious; pappus of the staminate flowers club-shaped, of the pistillate flowers united at the base and falling away together.

ANAPHALIS. Heads diœcious or polygamo-diœcious; pappus not club-shaped nor united at the base.

GNAPHALIUM. Heads with all the flowers fertile; pappus capillary.

INULA. Heads large, many-flowered, with yellow rays; pappus of rough capillary bristles.

Tribe **Heliantheae.** Heads radiate or discoid; involucre herbaceous or foliaceous; receptacle chaffy; pappus a cup or crown, or awns, bristles or scales, never capillary, sometimes none; style-branches truncate or hairy-appendaged.

* *Disk flowers perfect, but sterile, the rays fertile.*

POLYMNIA. Involucral scales in 2 rows, the 5 outer foliaceous; achenes thick, short, not flattened; pappus none

SILPHIUM. Involucral scales thick, imbricated in several rows; achenes flattened, wing-margined, in several rows; rays in 2 or 3 series; pappus none or 2 teeth.

PARTHENIUM. Involucral scales short, roundish, in 2 rows; achenes flattened, keeled and margined; rays 5, very short, the heads appearing discoid; pappus of 2 small scales.

* * *Disk-flowers fertile; rays deciduous except in Heliopsis, or none.*

ECLIPTA. Rays white, short; involucral scales in 2 rows; receptacle flat; chaff awn-like or bristle-like.

HELIOPSIS. Rays yellow, fertile; achenes 4-angled.

ECHINACEA. Rays rose-colored, pistillate, sterile; achenes 4-sided.

RUDBECKIA. Rays yellow, neutral; achenes 4-sided, marginless.

LEPACHYS. Rays yellow, neutral; achenes flattened laterally and margined.

HELIANTHUS. Receptacle flat or convex; achenes flattish, neither margined nor winged; pappus of 2 deciduous scales or awns.

ACTINOMERIS. Receptacle convex; achenes laterally flattened, 2-awned; leaves decurrent.

COREOPSIS. Receptacle flat; achenes flat; pappus of 2 short teeth or awns, or a mere border, or none.

BIDENS. Receptacle flat; achenes flat; pappus of 2-6 awns or teeth which are hispid or barbed.

Tribe **Helenieae.** Similar to the preceding tribe: receptacle not chaffy; pappus a row of chaffy scales, bristly-dissected in Dysodia; style-branches truncate or with hairy tips.

HELENIUM. Receptacle oblong; rays 3-5-cleft; involucral scales distinct; leaves decurrent.

DYSODIA. Receptacle flat; rays few, short; involucral scales united into a cup; ill-scented plants.

Tribe **Anthemideae.** Rays mostly white or none; involucral scales imbricated, usually dry and scarious; pappus a short crown or none. Strong-scented herbs with alternate leaves.

* *Receptacle chaffy.*

ANTHEMIS. Heads large; achenes terete.

ACHILLEA. Heads small; achenes flattened.

* * *Receptacle naked, sometimes hairy.*

CHRYSANTHEMUM. Heads large, many-rayed; pappus none.

TANACETUM. Heads small, corymbed, rayless; flowers yellow; pappus a short crown.

ARTEMISIA. Heads small, racemose, spicate or panicled, rayless; pappus none.

Tribe **Senecioneae.** Heads radiate or discoid; involucral scales little if any imbricated, not scarious; receptacle naked; pappus of soft capillary bristles.

SENECIO. Flowers yellow; heads usually radiate

CACALIA. Flowers white or cream-colored, all perfect; heads discoid; sap often milky.

ERECHTITES. Flowers whitish, the marginal pistillate, the central perfect; heads discoid.

Tribe **Cynareae.** Heads large, discoid; flowers tubular, perfect; involucral scales much imbricated; anthers long-tailed at the base, elongated-appendaged at the tip; style-branches short or united, smooth, often with a pubescent ring below.

ARCTIUM. Leaves not prickly; involucral scales hooked; pappus of rough bristles.

CNICUS. Leaves prickly; pappus-bristles plumose.

VERNONIA Schreb. *Iron-weed.* Perennials, with leafy stems, and corymbose cymes. Leaves alternate, acuminate Heads discoid, 15–40-flowered; flowers purple, tubular, perfect. Involucre shorter than the flowers, of many imbricated scales, the inner longest. Pappus double, outer scale-like, inner copious, capillary. Receptacle naked. Achenes cylindrical, ribbed. Species are with difficulty determined.

V. fasciculata Mx. Stem 3–7 feet high, glabrous; leaves narrowly lanceolate to linear, sharply denticulate; heads many, cyme close, involucre bell-shaped, half as long as the showy flowers; scales obtuse, closely appressed. Low grounds; August–September; common.

V. noveboracensis (L.) Willd. Stem 3–6 feet high, pubescent or glabrate, leaves lanceolate, serrulate; involucre purplish, scales ovate or lance-ovate, with filiform or subulate spreading tips. Moist soil; July–September; reported from Scott, Union, Pottawattamie, and Harrison counties. Specimens from Des Moines, Lee, and Cass counties referred to this species.

V. glauca (L.) Britton. Stem 2–5 feet high, glabrous, or finely pubescent; leaves thin, the lower oval or obovate, the upper ovate-lanceolate, acute or acuminate, pale beneath, sharply serrate; inflorescence loosely branched; heads few, slender-peduncled, 10–20-flowered; involucral scales acute or acuminate, appressed. Woods, August–September; reported, but questionable. (*V. noveboracensis latifolia* Gray.)

V. baldwinii Torr. Stout, 2–5 feet high, densely tomentose-pubescent; leaves lanceolate or oblong-lanceolate, acute or acuminate, sharply serrate, scabrous above, tomentulose beneath; heads stout-peduncled; involucral scales acute or acuminate, squarrose. Dry soil; July–September. Forms from Van Buren, Appanoose, Decatur, and Ringgold counties referred to this species.

EUPATORIUM L. Perennials. Flowers in corymbose heads, white, blue, or red, never yellow, all tubular, 5-cleft. Involucre imbricate. Receptacle flat, naked. Pappus a single row of capillary scabrous bristles. Style exserted, deeply cleft. Achenes 5-angled.

E. purpureum L. *Joe-Pye Weed.* Stem simple, 3–8 feet high, often purplish, pubescent above, mostly glabrous below; leaves 3–6 in a whorl, short-petioled, large, ovate-lanceolate to lanceolate, coarsely serrate, pointed; flowers flesh-color; involucral scales numerous, imbricated in several rows. Low grounds; August–September; common.

E. altissimum L. Stem simple, 2–6 feet high, soft-pubescent, leafy; leaves opposite, sessile, lanceolate, tapering both ways, conspicuously 3-nerved, entire or toothed beyond the middle; involucral scales oblong, shorter than the heads, in about two rows, outer shorter; heads 1-5-flowered. Dry ground; August–September; frequent; eastern and southeastern counties, sparingly westward; Winneshiek, Benton, Fayette, Muscatine, Des Moines, Henry, Johnson, Story, Decatur, and Harrison counties.

E. serotinum Mx. Stem 3–6 feet high, usually branched, soft-puberulent, leaves mostly opposite, a few upper alternate, long-petioled, ovate-lanceolate, 3-nerved, coarsely serrate; heads 12–15-flowered, in compound corymbs; involucre pubescent; scales obtuse. Low ground; August–September, infrequent; Fayette, Scott, Muscatine, and Woodbury counties.

E. perfoliatum L. *Boneset.* Stem 2–4 feet high, hairy, corymbosely branched; leaves opposite or in 3's, connate-perfoliate, lanceolate, pointed, crenate-serrate, downy beneath; heads 10–15-flowered, in a dense corymb, scales narrowly lanceolate, shorter than the flower. Low grounds; August; common. The number of flowers in the head and the connate character of the leaves vary greatly.

E. ageratoides L. *White Snake-root.* Stem smooth, simple or branched, 1–3 feet high; leaves opposite, petioled, thin, broadly ovate, pointed, 3-nerved, large toothed; heads 10–20-flowered, in a compound corymb, involucral scales in one row, oblong, obtuse. Woods; July–September; common.

E. coelestinum L. *Mist-flower.* Plant pubescent or puberulent, 1–3 feet high; leaves opposite, ovate, petioled, acute or obtuse, crenate-dentate, base truncate or slightly cordate; heads cymose-corymbose; flowers blue or violet. Moist soil; August–September; reported from Lee county by Arthur.

KUHNIA L. Perennials. Heads paniculate-corymbose, cream colored, discoid, 10–20-flowered. Involucral scales narrowly linear, loosely imbricated, parallel nerved. Pappus a row of white plumose capillary bristles. Achenes cylindrical, 10-striate.

K. eupatorioides L. Stem 2–3 feet high, erect, usually simple, minutely pubescent, leaves alternate, the upper sessile, the lower short-petioled, lanceolate or linear-lanceolate, entire or sparingly dentate, acuminate. Dry soil, August–September; common.

K. glutinosa Ell. Usually taller and stouter than the preceding, pubescent or tomentulose; leaves all sessile, lanceolate to ovate-lanceolate, sharply serrate, those of the branches linear-lanceolate and entire; heads numerous, densely clustered in cymes. Dry soil; August–September; reported from Fayette and Story counties; probably common. (*K. eupatorioides corymbulosa* T. & G.)

LIATRIS Schreb. BUTTON SNAKEROOT. BLAZING-STAR. Perennials, from a roundish corm, erect, simple, leafy. Leaves long-linear, entire, rigid, sessile, or lower oblong-lanceolate or oblong-ovate, petioled. Heads discoid, few to many-flowered. Involucral scales well imbricated in many rows. Receptacle naked. Pappus of from 15–40 capillary bristles. Achenes slender, tapering, 10-ribbed.

* *Involucre cylindric or turbinate, 15–16-flowered.*

L. squarrosa (L.) Willd. Stem 1–3 feet high; frequently hairy; leaves rigid, long-linear; heads few, racemose, about an inch in length; involucral scales tapering to an acute point, leaf-like, spreading; corolla-lobes hairy inside, pappus plumose. Prairie soil; August–September; Scott, Wapello,

Decatur, Taylor, Page, and Cass counties; common in southern Iowa. (*Lacinaria squarrosa* (L.) Hill.)

L. cylindracea Mx. Stem 6–18 inches high; heads few, oblong-cylindrical, ½ inch long; scales ovate, with appressed mucronate tips; pappus plumose; corolla-lobes hairy inside. Prairies; August–September; frequent, but apparently local; Fayette, Jones, Muscatine, and Story counties. (*Lacinaria cylindracea* (Mx.) Kuntze).

** *Involucre hemispheric; 15–45-flowered.*

L. scariosa (L.) Willd. Stem 3–5 feet high, scabrous-pubescent; leaves lanceolate, lower oblong-lanceolate and long-petioled; heads large, short, remotely racemose, few or many, 25–40-flowered; involucre hemispherical; scales obovate, obtuse, margins scarious, often colored; pappus barbellate. Prairie; August–September; common. (*Lacinaria scariosa* (L.) Hill.)

L. pycnostachya Mx. Stem 3–5 feet high, hairy or smoothish; upper leaves linear-lanceolate; heads small, many, few-flowered, in a dense spike, 6–20 inches long; scales oblong or lanceolate with recurved or spreading petal-like tips. Low prairies; August–September; common. (*Lacinaria pycnostachya* (Mx.) Kuntze).

L. punctata Hook. Stem 4–30 inches high, mostly glabrous; leaves narrowly linear, punctate, rigid; heads 3–6-flowered, usually many in a dense spike; scales oblong, acuminate, punctate; pappus very plumose; corolla-lobes naked. Dry sandy knolls; August–September; Fremont, Harrison, Woodbury, Lyon, Emmet, Hancock, and Dickinson counties. (*Lacinaria punctata* (Hook.) Kuntze).

GRINDELIA Willd. Coarse perennial glabrous herbs. Leaves alternate, sessile or clasping. Heads large, terminating the branches, radiate or discoid, many-flowered; rays pistillate. Involucral scales closely imbricated in several series, narrow-acuminate, green-tipped. Pappus of 2 or more awns. Achenes short, thick, glabrous.

G. squarrosa (Pursh) Dunal. Stem 1–3 feet high, leafy; leaves alternate, sessile, linear or spatulate-oblong, serrate; leaves and heads balsamic-viscid; rays pistillate, wanting in var. NUDA Gray. Waste places; August; infrequent; Woodbury, Sioux, Lyon, Ida, Palo Alto, Muscatine, Henry, Lee, Mahaska, Boone, and Fremont counties.

CHRYSOPSIS Nutt. Perennials, with hairy stems, and large heads terminating the branches. Rays many, yellow, pistillate. Involucral scales linear, imbricated. Receptacle flat. Pappus double, outer of short rather chaffy bristles, inner of long capillary bristles. Achenes linear, flat, obovate or linear-oblong.

C. villosa (Pursh) Nutt. Stem about 1 foot high, hairy, corymbosely branched; leaves alternate, oblong-spatulate, entire, hairy. Dry soil; August; frequent; Lyon county.

APLOPAPPUS Cass. Mostly perennials. Leaves alternate. Involucre hemispherical, of many closely imbricated scales. Receptacle flat. Heads many-flowered, radiate; rays pistillate, yellow. Disk flowers yellow. Pappus of simple bristles. Achenes short, top-shaped or linear.

A. spinulosus DC. Perennial; stem 4–12 inches high, usually spreading; leaves pinnately or bi-pinnately parted, lobes bristle-tipped; achenes pubescent. Loess mounds, forming dense patches; April–September; Harrison, Monona, and Woodbury counties. (*Eriocarpum spinulosum* (Nutt.) Greene.)

SOLIDAGO L. GOLDEN-ROD. Perennials, with slender erect stems, nearly sessile, entire or serrate, alternate cauline leaves, and racemose or clustered, yellow, rarely white, heads. Involucral scales appressed, oblong, rarely with green tips. Receptacle small, not chaffy, alveolate, fimbrillate in the last. Rays pistillate, few to many. Disk flowers perfect, yellow. Pappus simple, capillary, scabrous. Achenes teretish, ribbed. Flowers appear in August and September.

* *Inflorescence in the axils of feather-veined leaves.*

S. latifolia L. Stem 2–3 feet high, angular, ziz-zag, smooth or downy above; leaves broadly oval, thin, deeply serrate, acuminate, base tapering into a margined-petiole, pubescent beneath; flowers in short axillary clusters, the terminal racemose; scales appressed; rays 3–4. Rich woods; July–September; frequent; Allamakee, Fayette, Delaware, Jackson, Johnson, Henry, Des Moines, Story, Decatur, Winnebago, and Emmet counties. (*S. flexicaulis* L.

S. bicolor L. Stem 1–2 feet high, simple, hairy; leaves elliptical to oblong, acute both ways, the lower slightly serrate, tapering into a petiole; flowers in small axillary clusters, rays 6–12, white; involucral scales obtuse. Woods; infrequent; Johnson and Winneshiek counties.

* * *Inflorescence a terminal panicle.*

† *Leaves not triple-ribbed; racemes not secund.*

S. speciosa Nutt. Stem 3–6 feet high, simple, smooth; leaves thickish, the upper oval or oblong, smooth, rough-margined, lower ovate or broadly oval, sub-serrate, petioles margined; panicle ample, thyrsoid, rough-pubescent, scales oblong; rays 5–8. Upland borders; common in eastern Iowa, rarer westward.

S. rigidiuscula (T. & G.) Porter. Stem rather strict, 2–4 feet high, glabrous below, rough-pubescent above; leaves lanceolate or oblong-lanceolate, entire or the basal crenate, margins ciliolate, sessile or the lower petioled. Prairies; common throughout western Iowa, but the range is not well known as the species has been confused with the preceding. (*S. speciosa angustata* Gr.)

† † *Leaves not triple-ribbed; racemes secund.*

S. patula Muhl. Stem 4–5 feet high, smooth, angular-striate; leaves ample, ovate, acute, serrate, very rough above, smooth and veiny beneath; heads rather large, in short racemes, on spreading branches; scales obtuse. Swamps, Cedar river region; Muscatine county.

S. ulmifolia Muhl. Stem 2–4 feet high, glabrous; branches pubescent; leaves elliptic-ovate or oblong-lanceolate, tapering both ways, thin, veiny and soft-hairy beneath, sharply serrate or the upper entire; branches of the panicle long, slender, recurved; involucral scales lanceolate-oblong; ray and disk flowers 3–4. Woods; common; variable; Winneshiek, Jackson, Johnson, Henry, Des Moines, Decatur, and Taylor counties; reported from Fayette, Scott, and Story counties.

† † † *Leaves more or less triple-ribbed; stem glabrous, panicle sometimes pubescent.*

S. missouriensis Nutt. Stem 2–3 feet high, simple, smooth throughout; leaves linear-lanceolate, tapering both ways, entire or sparingly denticulate, rough-margined, the lower frequently lanceolate, serrate; racemes short, dense; involucral scales obtuse, thick. Dry woods and prairies; common; flowering earlier than the other species; Muscatine, Johnson, Story, Decatur, Ringgold, Page, Fremont, Cerro Gordo, Dickinson, and Lyon counties; reported from Fayette, Monona, and Harrison counties.

S. serotina Ait. Stem 3–6 feet high, glabrous, often glaucous, branched above; leaves lanceolate, taper-pointed, sharply serrate above the tapering base, smooth on both sides, rough ciliate; panicle ample, pubescent; involucral scales linear, obtuse; rays long. The var. GIGANTEA Gray has the leaves more or less pubescent beneath. Open woods and borders; common; Winneshiek, Clayton, Dubuque, Muscatine, Johnson, Henry, Des Moines, Decatur, Taylor, Winnebago, Dickinson, and Emmet counties; reported from Fayette, Story, Hamilton, and Woodbury counties.

S. rupestris Raf. Stem slender, glabrous, 2–3 feet high; leaves thin, linear-lanceolate, tapering both ways, entire or sparingly serrate; heads small; rays short, 4–6. Loess mounds; Woodbury county, reported by Pammel, also reported from Scott county by Nagel and Haupt.

† † † † *Leaves more or less triple-ribbed; stem pubescent.*

S. canadensis L. Stem 3–5 feet high, pubescent; leaves lanceolate, acuminate, sharply serrate or nearly entire, pubescent beneath, rough above; heads numerous, small; rays short. Borders and fields; common; varies greatly; Winneshiek, Clayton, Dubuque, Floyd, Delaware, Johnson, Henry, Decatur, Calhoun, Winnebago, and Emmet counties; reported from Fayette, Scott, Story, Hamilton, Dickinson, Monona, and Woodbury counties.

S. nemoralis L. Stem 6–24 inches high, cinereous-pubescent, simple or corymbed above; leaves spatulate or oblanceolate, entire or the lower somewhat serrate and tapering into a petiole; heads small, in numerous usually recurved racemes; involucral scales linear-oblong, appressed. Dry soil; common; Winneshiek, Dubuque, Floyd, Delaware. Johnson. Henry, Des Moines, Decatur, Story, Calhoun, Winnebago, Dickinson and Emmet counties; reported from Fayette and Hamilton counties.

* * * *Heads in compound corymbs or in cymose clusters.*

† *Stem densely pubescent.*

S. rigida L. Stem 2–4 feet high, stout, leafy, softly pubescent or scabrous; leaves oval or oblong, thick, rigid. entire or obscurely serrate, feather-veined; lower leaves oblanceolate, tapering into slender petioles; heads numerous, large, many-flowered; involucral scales very obtuse; rays 7–10. Prairies; common; Winneshiek, Floyd. Johnson, Decatur, Fremont, Jasper, Winnebago, Emmet, and Lyon counties; reported from Fayette, Scott, Story, Hamilton, Monona, and Woodbury counties.

† † *Stem glabrous or nearly so.*

S. riddellii Frank. Stem 1–3 feet high, glabrous, stout; leaves long and narrow, entire, from a sheathing base, mostly recurved, radical leaves very long, tapering into long petioles; heads numerous, many-flowered, in a dense corymb, the branches and pedicels rough-pubescent; rays 5–7. Low prairies, sloughs, often growing in water; infrequent; Muscatine, Floyd, Hancock, and Emmet counties; reported from Story and Hamilton counties.

S. lanceolata L. Stem from a long and slender rootstock, 1–3 feet high, much branched, usually smooth; leaves narrowly lanceolate, sessile, 3-nerved, heads small, in sessile glomerate clusters disposed in flat-topped corymbs; rays small, 15–20; late flowering. Sandy or wet soil, pastures and copses common; Johnson, Henry, Decatur, Dickinson, and Emmet counties; reported from Fayette, Scott, and Story counties. (*Euthamia graminifolia* (L.) Nutt.)

BOLTONIA L'Her. Bushy-branched glabrous perennials, with striate angled stems, entire leaves, and Aster-like flowers. Heads many-flowered, radiate; rays many, pistillate. Scales in two series, appressed, with scarious

margins. Receptacle convex, punctate. Pappus of minute bristles and often 2–3 awns. Achenes flat, obovate, 2–3-winged.

B. asteroides (L.) L'Her. Stem 1–6 feet high; leaves long-lanceolate, entire; involucral scales acuminate. Moist soil, sloughs and low places; July–September; frequent; Muscatine, Johnson, Henry, Lee, Decatur, Ringgold, Taylor, Winnebago, and Emmet counties; reported from Story, Harrison, Monona, and Woodbury counties.

ASTER L. ASTER. Perennials, with alternate leaves, and panicled, corymbed, or racemose heads. Disk-flowers perfect, yellow to purplish; rays pistillate, 3-toothed at the apex; white, blue, or purple, never yellow. Involucral scales loose, imbricated, often with green tips. Pappus simple, or double in the last, capillary. Receptacle flat, alveolate. Achenes compressed. Common in late summer and autumn.

A. *Pappus simple, of capillary bristles.*

* *Lower and basal leaves cordate and slender-petioled, the stem leaves not cordate-clasping.*

† *Rays white, violet, or rose.*

A. corymbosus Ait. Stem 1–2 feet high, nearly smooth, somewhat flexuous; leaves ample, ovate, acuminate, thin, coarsely serrate, all but the uppermost with a heart-shaped base, and on long wingless petioles; heads oblong, in small open corymbs; rays 6–9, white. Rich woods; Muscatine county. (*A. divaricatus* L.)

A. macrophyllus L. Stem 2–3 feet high, rigid, rough-pubescent; leaves thickish, rough, serrate, pubescent beneath, the upper ovate or oblong, sessile or on margined petioles, the lower cordate and long-petioled; heads one-half inch high, larger than the preceding; scales obtuse, the inner longer and thinner. Hilly woodlands, not rare; Muscatine county.

† † *Rays blue or purple, rarely white.*

‡ *Leaves entire or nearly so, firm, or thick.*

A. azureus Lindl. Stem 1–3 feet high, rigid, roughish, paniculately branched; leaves rough, the radical and lower cauline leaves lanceolate, more or less with cordate bases, on long petioles, the upper lanceolate to linear or subulate, wing-petioled or with attenuated base to sessile; rays violet blue; involucre obconic; scales with abrupt green tips, appressed. Prairies and thickets; frequent; Johnson, Story, Des Moines, Appanoose, and Decatur counties.

A. shortii Hook. Stem 2–4 feet high, rough-pubescent; leaves lanceolate or ovate-lanceolate, long-acuminate, entire, on slender naked petioles, base deeply cordate, smooth above, minutely pubescent beneath, the upper leaves sessile; racemes paniculate; involucre campanulate; scales with green tips. Cliffs and banks; infrequent; Winneshiek, Muscatine, Johnson, and Lee counties, reported from Fayette county.

‡ ‡ *Leaves mostly sharply serrate, thin.*

A. cordifolius L. Stem 1–3 feet high, smooth or slightly pubescent, rarely hairy, paniculately branched above; leaves ovate-cordate, sharply serrate, on long slightly margined petioles, or upper lanceolate and sessile; heads panicled; rays pale blue or white; involucre obconic, scales appressed, tipped with short green points. Woods; common; Winneshiek, Johnson, and Decatur counties, reported from Fayette, Story, and Des Moines counties.

A. sagittifolius Willd. Stem 2–4 feet high, rigid; leaves ovate-lanceolate, pointed, serrate, pubescent beneath, the lower with the base truncate or cor-

date and wing-petioled, the upper linear or lanceolate, sessile; heads racemose, scales loose, linear-subulate. Woods; common; Fayette, Delaware, and Johnson counties; reported from Winneshiek, Allamakee, Clayton, Dubuque, Des Moines, Henry, Plymouth, and Monona counties.

A. drummondii Lindl. Stem stout, 2–4 feet high, pale, grayish pubescent; leaves ovate or ovate-lanceolate, acuminate, rough above, canescent beneath the lower and basal cordate, with slender naked petioles, the upper with cordate or rounded bases and margined petioles, those of the branches sessile. Dry soil, open woods; infrequent: Winneshiek, Delaware, Muscatine, Henry, Des Moines, Johnson, Jasper, Winnebago and Dickinson counties, reported from Story and Floyd counties.

* * *Leaves not cordate or petioled, some or all of the cauline with cordate or auriculate clasping bases.*

† *Stem rough, or hirsute-pubescent.*

‡ *Leaves entire, oblong, linear, or lanceolate.*

§ *Leaves sessile, strongly cordate-clasping.*

A. patens Ait. Stem 2–4 feet high, rough-pubescent, loosely paniculate above; leaves ovate-oblong to oblong-lanceolate, cordate-clasping; heads large, terminal; rays many, violet-blue; scales slender, tips acute, spreading. Forms from Delaware county have been referred to this species.

A. phlogifolius Muhl. Stem 2–4 feet high, rough-pubescent; leaves lanceolate to oblong-lanceolate, entire, acuminate, auriculate-clasping, much contracted below the middle, thin, rough above, pubescent beneath; rays many, purple blue. Woods; Winnebago county. (*A. patens* var. *phlogifolius* Nees.)

A. novae-angliae L. Stem 3–7 feet high, stout, hairy, leafy, corymbosely branched; leaves lanceolate, auriculate-clasping, entire, acute; rays many, violet-purple, rarely varying to rose-purple, or white; scales nearly equal, green throughout, narrowly linear. Sloughs and low places; common; Winneshiek, Floyd, Delaware, Johnson, Jefferson, Des Moines, Appanoose, Decatur, Story, Winnebago, Lyon, and Emmet counties; reported from Fayette and Monona counties.

§ § *Leaves slightly cordate clasping.*

A. oblongifolius Nutt. Stem 1–2 feet high, much branched, hirsute-pubescent, leafy; leaves narrowly oblong to oblong-lanceolate, entire, clasping, rough or hispidulous on both sides, rough-margined; rays violet purple; involucre hemispheric, the bracts glandular. Prairies and rocky bluffs; infrequent; Fayette, Muscatine, Des Moines, Johnson, Pottawattamie, Calhoun, and Lyon counties; reported from Story, Monona, and Woodbury counties.

A. amethystinus Nutt. Resembles the preceding, stem taller, 2–5 feet high, hoary puberulent or somewhat hirsute; leaves linear-lanceolate, rough on both sides, partly clasping; involucral scales erect, the green tips merely spreading, involucre turbinate, the bracts hispid. Moist places, scarce; reported from Floyd and Story counties.

‡ ‡ *The lower and most of the upper leaves serrate.*

A. puniceus L. Stem stout, 3–6 feet high, hispid; leaves oblong-lanceolate, auriculate-clasping, acuminate, coarsely serrate to sparingly denticulate or sometimes entire; heads rather large, sparsely paniculate or thyrsoid-crowded; involucre of loose, thin, equal, linear scales, arranged in two rows; rays ⅓ inch long, showy, violet, varying to purple or white. Swampy grounds; frequent; Fayette, and Muscatine counties, reported from Story county.

† † Stem glabrous or sparingly pubescent above.

‡ Leave sharply serrate, sometimes in A. laevis.

A. prenanthoides Muhl. Stem 1–3 feet high, slender, nearly glabrous or hairy above; leaves thin, ovate-lanceolate, taper-pointed, sharply serrate in the middle, tapering into a slender, elongated, entire portion towards the base, upper surface rough, lower smooth, base auriculate-clasping; heads about ½ inch high, on short divergent peduncles, involucral scales narrow, somewhat spreading; rays light blue or whitish. Rich woods; frequent; Jackson, Delaware, Muscatine, and Johnson counties, reported from Fayette and Story counties.

A. laevis L. Stem 2–4 feet high, smooth, often glaucous; leaves lanceolate or oblong-lanceolate, entire or sub-serrate, thickish, radical and lower leaves large, wing-petioled, the upper partly clasping by an auriculate base; heads chiefly solitary on the branchlets; involucre hemispherical, scales with broad, acute, appressed, green tips. Prairies and rocky woods; frequent and widely distributed; Winneshiek, Fayette, Floyd, Delaware, Johnson, Henry, Decatur, Winnebago, Lyon, Dickinson, and Emmet counties, reported from Story and Hamilton counties.

‡ ‡ Leaves entire or nearly so.

A. longifolius Lam. Stem 1–3 feet high, glabrous or somewhat pubescent, branched; leaves long-lanceolate to linear-lanceolate, entire or nearly so, acuminate, base sessile, clasping; heads numerous, about an inch broad, the scales narrow, green, acute, in 1 or 2 rows. Moist soil; specimens from Delaware and Henry counties referred to this species.

** * * Leaves petioled or sessile, not clasping or scarcely so.*

† Leaves entire, silvery, silky or canescent or both sides.

A. sericeus Vent. Stem 1–3 feet high, smooth, very rigid, branched; leaves lanceolate or oblong, sessile, entire, silvery white on both sides; heads large, mostly terminal, on slender branches; rays many, violet-purple; scales leaf-like, tips spreading. Common on the prairies in western and southern Iowa, infrequent eastward; Winneshiek, Delaware, Muscatine, Johnson, Decatur, Ringgold, Taylor, Page, Fremont, Montgomery, Pottawattamie, Winnebago, Lyon, and Emmet counties; reported from Fayette, Story, Buena Vista, Monona, Harrison, and Woodbury counties.

† † Leaves often toothed, neither silvery, silky nor canescent.

‡ Heads corymbose.

A. ptarmicoides (Nees) T. & G. Stems simple, tufted, 8–20 inches high, smooth or sparingly pubescent; leaves linear-lanceolate, 1–3-nerved, acute, entire, rough-margined, lower tapering to a short petiole; heads in a flat corymb; involucral scales imbricated in 3 or 4 rows, appressed, without green tips; rays white. Sandy soil; Muscatine, Emmet, and Lyon counties.

‡ ‡ Heads solitary at the ends of the branchlets.

A. dumosus L. Stem 1–3 feet high, glabrous, paniculately branched; leaves linear or linear-lanceolate, entire, acute or obtusish, rough-margined, those of the branches small and bract-like; heads many, terminating the branches and branchlets; involucre campanulate, the scales in 4 rows, linear-subulate, obtuse or acutish, appressed, green-tipped; rays 15–30, white to pale violet. Sandy soil; reported from Benton county by Arthur; specimens from Lee county have been referred to this species.

‡ ‡ ‡ Heads paniculate, not in 1-sided racemes.

A. salicifolius Lam. Stem 2–5 feet high, slender, paniculately branched, leafy, glabrous or slightly pubescent above; leaves lanceolate or linear-lan-

ceolate, sparingly dentate or entire, rough-margined, acute or acuminate, sessile or somewhat clasping, the lowest sometimes petioled; heads numerous, rather large; involucre turbinate, its bracts linear-oblong, green-tipped, acute or obtusish, appressed, in 4 or 5 series; rays many, violet, purplish, or white. Low moist soil; common; Johnson, Henry, and Decatur counties.

A. **paniculatus** Lam. Stem 2–8 feet high, glabrous, paniculately branched; leaves lanceolate or oblong-lanceolate, acuminate, base narrowed and sessile or clasping, sparingly serrate to nearly entire; heads many, rather broad; involucre hemispheric, the bracts linear-lanceolate, acute or acuminate, appressed, green-tipped, in 4 or 5 rows; rays many, white or purplish. Moist soil; Fayette county, reported from Story, Woodbury, Lyon, Lee, and Henry counties.

A. **tradescanti** L. Stem 2–5 feet high, slender, paniculately branched, branches ascending and sometimes pubescent in lines; cauline leaves lanceolate or linear-lanceolate, acuminate, narrowed to the sessile base, entire or more commonly sharply serrate in the middle; heads numerous, racemose; involucre hemispheric to broadly turbinate, its bracts linear, acute, green-tipped, appressed, in 4 or 5 rows; rays white or whitish, short and narrow. Fields and low places; specimens from Delaware and Johson county have been referred to this species.

A. **ericoides** L. Stem 1-3 feet high, bushy, paniculately branched, glabrous; leaves firm or rigid, the basal spatulate, obtuse, dentate, with margined-petioles; cauline leaves linear, entire, acute, the uppermost linear-subulate; heads many; involucre hemispheric to campanulate, the bracts green-tipped, linear-lanceolate or lanceolate, in about 3 rows; rays 15–25, white or rosy tinged. Dry soil; Henry county, reported from Lee and Monona counties.

‡ ‡ ‡ ‡ *Heads racemose and usually 1-sided on the branches.*

A. **diffusus** Ait. Stem 1–4 feet high, much branched, pubescent or nearly glabrous; leaves lanceolate or oblong-lanceolate, tapering both ways, sharply serrate in the middle or the smaller entire, sessile, thinnish; heads disposed singly or in clusters along the flowering branches; rays short, white or sometimes purplish; involucral scales linear, obtuse or acutish. Low woods; common; Story, Fayette, Delaware, Johnson, Henry, Appanoose, and Decatur counties. (*A. lateriflorus* (L.) Britton).

A. **multiflorus** Ait. Stem about a foot high, bushy-branched, grayish, pubescent; leaves small, linear, entire, sessile or partly clasping; heads small, crowded in numerous racemes; herbaceous tips of the involucral scales spreading; rays white, rarely bluish. Sandy soil, woods and prairies; common; Winneshiek, Fayette, Floyd, Delaware, Scott, Muscatine, Des Moines, Henry, Jefferson, Johnson, Story, Hamilton, Appanoose, Decatur, Ringgold, Taylor, Harrison, Woodbury, and Emmet counties.

B. *Leaves petioled or sessile, entire; pappus double, the inner bristles long, the outer shorter.*

A. **umbellatus** Mill. Stem 2–8 feet high, glabrous or pubescent above, striate, corymbosely branched; leaves lanceolate to oblong-lanceolate, taper pointed, base narrowed into short petioles, upper sessile, usually pubescent on the veins beneath, entire, margin hispid; heads many, in compound flat corymbs; involucre campanulate or hemispheric, the scales acutish or obtusish, in 3 or 4 rows. Low grounds; Johnson and Story counties, reported from

Fayette county. (*Doellingeria umbellata* (Mill.) Nees.) The variety PUBENS Gray has the lower surfaces of the leaves pubescent and is reported from Story county. (*D. umbellata pubens* (Gray) Britton).

ERIGERON L. FLEABANE. Herbs, with alternate simple leaves, and solitary or corymbose pedunculate heads. Ray-flowers many, pistillate, white or purple; disk-flowers yellow. Involucral scales narrow, equal, scarcely imbricated. Receptacle flat or convex. Pappus of capillary bristles, mostly simple. Achenes compressed, 2-nerved, frequently pubescent.

* *Heads small, rays short, inconspicuous, in several rows.*

E. canadensis L. *Horse-weed.* Stem 1–5 feet high, erect, hairy; leaves linear to linear-lanceolate, usually entire, radical cut-lobed; heads small, numerous, paniculate; rays short, white. Waste places; July–October; common. (*Leptilon canadense* (L.) Britton).

E. divaricatus Mx. Stems low, 3–15 inches high, diffuse and decumbent, hairy; leaves linear, entire; heads small, corymbose; rays purple. Prairie or open woods; June–August; common; Emmet, Story, Johnson, Muscatine, Appanoose, Decatur, Ringgold, and Fremont counties. (*L. divaricatum* (Mx.) Raf.)

* * *Heads larger, rays elongated, conspicuous, in one or more rows.*

E. annuus (L.) Pers. *Daisy Fleabane.* Stem 2–4 feet high, branching, hirsute; leaves ovate to lanceolate, sessile or lower on margined petioles, coarsely and sharply toothed; rays numerous, purplish. Fields and waste places; June–August; common.

E. strigosus Muhl. *Daisy Fleabane.* Stem 2–3 feet high, branched, appressed pubescent or nearly smooth; upper leaves lanceolate, lower oblong or spatulate, 3-nerved, tapering into a petiole, all mostly entire; rays white. Fields; June–August; common. (*E. ramosus* (Walt.) B. S. P.)

E. philadelphicus L. *Common Fleabane.* Stem about 2 feet high, hairy; leaves clasping by a heart-shaped base, ovate, or lower spatulate, entire or remotely toothed, thin; heads few, corymbed; rays rose-purple. Upland woods; May–July; common.

E. bellidifolius Muhl. *Robin's Plantain.* Stem 1–2 feet high, hairy, simple; radical leaves obovate or spatulate, sparingly toothed, stem leaves remote, lance-oblong, clasping, entire; heads few, large, on slender peduncles; rays 50 or more, linear-spatulate, rather broad, purple. Woods; May–June; infrequent. Winneshiek, Fayette, Muscatine, Delaware, Johnson, Henry and Jackson counties. (*E. pulchellus* Mx.)

ANTENNARIA Gaertn. Perennial white-woolly herbs, with alternate entire leaves, and corymbed heads of diœcious or polygamo-diœcious flowers. Heads many-flowered, discoid. Scales of the involucre imbricated, white or colored, dry and scarious. Receptacle sub-convex, foveolate, not chaffy. Pappus a single row of bristles, in the pistillate flowers capillary and united at the base, in the staminate flowers thickened and barbellate above. Fertile corollas slender. Achenes terete or flattish.

A. plantaginifolia (L.) Richards. Stem 4–18 inches high, simple, with running stolons, forming patches, radical leaves spatulate to obovate or oval, 3-nerved, petioled, cauline leaves sessile, oblong or lanceolate to linear, the upper small, bract-like; heads in a close terminal corymb. Fields and upland woods; April–May; common.

ANAPHALIS DC. White-woolly perennials, with many of the characters of the preceding genus. Fowers diœcious, usually the pistillate heads with a few perfect but sterile flowers in the center. Pappus in the pistillate flowers

not united at the base, of copious capillary bristles, in the staminate flowers not thickened above.

A. margaritacea (L.) Benth. & Hook. Stem 1–2 feet high, simple, corymbosely branched above, leafy; leaves nearly linear to broadly lanceolate, acuminate, entire, sessile, becoming green above, the larger obscurely 3-nerved; involucral scales pearly-white, numerous, unequal, imbricated, obtuse. Fields and open woods; July–August; frequent; Delaware, Johnson, and Decatur counties; perhaps generally distributed. This species is confused with the following, the general appearance of which it resembles.

GNAPHALIUM L. Woolly or pubescent herbs, with sessile alternate leaves, and variously clustered heads of fertile flowers. The pistillate flowers in several series, the perfect flowers central, few. Pappus of capillary bristles.

G. polycephalum Mx. Annual or winter-annual; stem 1–3 feet high, woolly or tomentose; leaves lanceolate or linear-lanceolate, sessile, glabrate above, white-woolly beneath, margins undulate; heads in corymbose or paniculate clusters; pappus-bristles distinct. This species is frequently reported. (*G. obtusifolium* L.)

INULA L. Coarse perennials, with alternate simple leaves, and large many-flowered heads. Rays pistillate, yellow. Disk flowers perfect, yellow. Involucre hemispherical, of imbricated foliaceous scales. Receptacle naked. Pappus simple, of capillary bristles. Anthers sagittate at the base, the auricles caudate. Achenes somewhat 4 or 5-ribbed.

I. helenium L. *Elecampane.* Stem 2–6 feet high, from a large thick root; leaves large, oblong or ovate, woolly beneath, entire or denticulate, radical petioled, cauline clasping; scales ovate. Open woods; July–August; local: Johnson county; rarely in waste places, Decatur county.

POLYMNIA L. Perennial branching herbs, with opposite or alternate thin lobed leaves, and light yellow flowers. Heads radiate, many-flowered; rays few, pistillate; disk flowers perfect but sterile. Involucral scales in two rows; outer about 5, leaf-like, spreading; inner smaller, membranaceous. Receptacle flat, chaffy. Pappus wanting.

P. canadensis L. Stem 2–5 feet high, clammy-hairy; leaves petioled, the lower pinnatifid, the upper deltoid-ovate or hastate, 3–5-lobed or entire; rays 5, in the typical form shorter than the involucre, often minute or obortive; achenes 3-ribbed. The form represented in our flora is variety RADIATA Gray, which has the rays longer and 3-lobed. Wooded ravines; June–July; frequent; Winneshiek, Allamakee, Clayton, Dubuque, Fayette, Muscatine, and Des Moines counties.

SILPHIUM L. ROSIN-WEED. Coarse perennials, with alternate or opposite leaves, resinous juice, and large yellow-flowered heads. Ray-flowers many, pistillate, fertile, in 2 or 3 rows, outer ligulate; disk-flowers perfect, sterile; style entire. Involucral scales foliaceous, spreading, in several rows. Receptacle flat, chaffy. Pappus wanting or of 2 teeth. Achenes broad, flat, dorsally compressed.

* *Stems terete; leaves alternate.*

S. laciniatum L. *Compass-plant.* Whole plant covered with whitish hairs; stem 3–10 feet high, terete, simple; leaves alternate, pinnately parted; divisions linear, cut, sinuate-lobed or entire; petioles dilated at their bases; radical or lower leaves 1–2 feet long; heads large, several, sessile or short peduncled, mostly alternately arranged along the upper part of the naked

stem; scales ovate, tapering into long and spreading points; achenes broadly winged. Prairies; July; frequent throughout the state.

S. terebinthinaceum Jacq. Stem 4–10 feet high, branched, scaly, glabrous or nearly so; leaves basal, large, ovate, long-petioled, apex acute, base cordate, both sides rough, sharply dentate; heads many; achenes obovate, narrowly winged. Prairies and dry woods; reported from Iowa.

* * *Stems square; leaves or their petiole-bases connate-perfoliate.*

S. perfoliatum L. *Cup-plant.* Stem square, 4–7 feet high, often branched above; leaves large, thin, ovate, rough, remotely-toothed, opposite or in 3's, their bases connate, forming a cup around the stem; lower leaves wing-petioled; bases of petioles dilated and connate; heads corymbose, on long peduncles; scales ovate, achenes winged. Moist soil; July–August; frequent throughout the state.

* * * *Stems terete or slightly 4-angled; leaves opposite or whorled.*

S. integrifolium Mx. Stem 4-angled and grooved, 2–4 feet high, smooth or scabrous; leaves opposite or uppermost alternate, ovate-lanceolate, rough-pubescent or smooth, entire, rigid, sessile, bases cordate, partly clasping; heads short-peduncled, in a close corymb; achenes broadly winged. Prairies, roadsides, and open woods. July–August; frequent throughout the state.

S. trifoliatum L. Stem 4–7 feet high, glabrous, sometimes glaucous; leaves lanceolate or oblong-lanceolate, the middle ones in whorls of 3 or 4, the uppermost opposite, acuminate, narrowed at the base, rough above, glabrate beneath, short-petioled, entire or somewhat denticulate; heads several or many; achenes rather broadly winged. Woods; reported from Winnebago and Clinton counties.

PARTHENIUM L. Perennials, with alternate leaves, and corymbose heads. Rays 5; ligules white, short, obcordate, fertile; disk-flowers many, sterile. Involucre hemispherical; scales in 2 series, ovate or roundish. Receptacle conical, chaffy. Achenes compressed, crowned with 2 teeth and the remains of the corolla.

P. integrifolium L. *Prairie Dock.* Stem 1–4 feet high, rough-pubescent, mostly simple; radical or lower leaves long-petioled, ample, ovate, crenate-toothed, coriaceous, upper sessile; heads many. Upland soil; June–September; frequent; more common in the eastern and southern counties; Winneshiek, Allamakee, Fayette, Dubuque, Muscatine, Johnson, Henry, Appanoose, Decatur, Ringgold, and Fremont counties.

ECLIPTA L. A rough annual, with opposite leaves, and small solitary many-flowered heads. Rays short, white, numerous, fertile; disk-flowers perfect, 4-toothed, fertile. Involucral scales in 2 rows, ovate-lanceolate, foliaceous. Receptacle flat, with bristle-like chaff. Pappus wanting or of 2–4 teeth or short awns. Achenes thick, in the rays mostly 3-sided, in the disk-flowers compressed, more or less margined.

E. alba L. Hasskarl. Stem procumbent or ascending, 1–3 feet high, appressed-pubescent; leaves mostly sessile, lanceolate or oblong, tapering both ways, sparingly serrate; rays scarcely exceeding the disk. River banks; July–August; infrequent; Johnson, Linn, Muscatine, and Lee counties.

HELIOPSIS Pers. Perennials, with opposite petioled 3-nerved leaves, and yellow flowers. Involucre short, of 2 or 3 rows of imbricated subequal scales. Rays 10 or more, fertile. Receptacle conical, with linear chaff. Pappus coroniform, of 2–3 teeth, or wanting. Achenes truncate, smooth, 4-sided.

H. scabra Dunal. *Rough Ox-eye.* Stem 2–4 feet high, somewhat pubescent

scabrous; leaves broadly ovate to ovate-lanceolate, scabrous, serrate; rays oblong or linear, 2–3-toothed; achenes pubescent on the angles when young. Prairies and open woods; June–September; frequent throughout the state.

H. laevis Pers. Similar to the preceding; stem 3–5 feet high, glabrous; leaves opposite, sometimes in 3's; ovate or ovate-lanceolate, rather thin, acuminate, sharply dentate, smooth on both sides or roughish above; achenes glabrous, truncate. Woods; July–September; infrequent; Muscatine, Decatur, and Fremont counties. (*H. helianthoides* (L.) B. S. P.)

ECHINACEA Moench. Perennials, with mostly alternate 3–5-nerved leaves, and single terminal large heads. Involucral scales in 2 or 3 rows, imbricated, lanceolate, spreading. Receptacle conical, bristling with spiny-tipped chaff. Rays rose-purple, long, drooping, pistillate but sterile. Disk-flowers purplish, shorter than the chaff. Pappus a few teeth. Achenes thick, short, 4-sided.

E. angustifolia DC. *Pale Purple Cone-flower.* Stem 1–3 feet high, bristly-hairy, simple; leaves lanceolate or linear-lanceolate, entire, tapering both ways, long-petioled, bristly hairy; rays 12–15, 2–3-toothed, 1–2 inches long. Prairies; June–September; common. (*Brauneria pallida* (Nutt.) Britton).

E. purpurea Moench. *Purple Cone-flower.* Stem 2–4 feet high, rough-hairy to nearly smooth; lower leaves long-petioled, ovate, 5-nerved, upper usually 3-nerved, all rough and frequently serrate; involucral-scales in 3–5 rows, lanceolate; rays 15–20, dull purple, bifid, 1–2 inches long. Woods; July–August; infrequent; Appanoose, Decatur, and Louisa counties. (*B. purpurea* (L) Britton).

RUDBECKIA L. Biennials or perennials, with alternate leaves, and terminal showy many-flowered heads. Involucral scales about 12, in 2 rows, foliaceous. Receptacle conical or columnar, chaffy. Rays many, neutral, mostly yellow. Disk-flowers perfect. Pappus a toothed or cut margin, or wanting. Achenes 4-angled.

R. triloba L. *Brown-eyed Susan.* Biennial; stem 2–5 feet high, with slender spreading branches; lower leaves 3-lobed or 3-parted, serrate; upper ovate-lanceolate, serrate, acuminate, subsessile; heads small; disk conical, dark purple; chaff awned, rays about 8, oval or oblong. Woods; August–September; common.

R. subtomentosa Pursh. Stem 3–4 feet high, branching, downy and scabrous; leaves mostly 3-lobed or 3-parted, downy, divisions ovate or ovate-lanceolate, serrate; heads corymbose, short-peduncled; disk globular, dull brown; chaff obtuse, bearded. Prairies and open woods; August–September; frequent; Muscatine, Johnson, and Decatur counties; reported from Fayette and Story counties.

R. hirta L. *Black-eyed Susan.* Biennial, bristly-hairy throughout; stem 1–2 feet high, mostly simple; upper leaves oblong or lanceolate, mostly entire, sessile, lower long-petioled, spatulate, 3-nerved; rays 9–14; disk dull brown; chaff hairy at the apex. Woods and prairies; June–August; common.

R. laciniata L. Stem glabrous, 2–7 feet high; lower leaves 3-lobed or 5–7-parted, divisions usually cut or lobed, ovate-lanceolate, acuminate; heads on long slender peduncles; disk globular in flower, columnar in fruit; rays oblanceolate, drooping. Low grounds; August; common.

LEPACHYS Raf. Perennial herbs, with alternate pinnately divided leaves, grooved stems, and terminal heads. Involucral scales linear, in one row. Receptacle oblong or columnar, chaffy. Rays few, neutral, yellow. Disk-flowers perfect. Pappus of 2 teeth or wanting. Achenes compressed, 1–2-winged.

L. pinnata T. & G. Stems 2–4 feet high, stigose-pubescent, slender, branched above; leaflets 3–7, narrowly lanceolate, entire or remotely serrate; disk ovoid; rays about 2 inches long, light yellow, drooping; achenes obscurely 2-tipped. Prairies; July–August; frequent and widely distributed. (*Ratibida pinnata* (Vent.) Barnhart.)

L. columnaris T. & G. Stem 1–2 feet high, strigose-pubescent and scabrous, branched; leaflets 5–9, oblong to linear, entire or 2–3-cleft, heads on long peduncles; disk columnar, 1–2 inches long; rays usually shorter, ovate, yellow. Prairies; August; rare; Henry, Page, Boone, and Lyon counties. (*R. columnaris* (Sims) D. Don).

HELIANTHUS L. SUNFLOWER. Annual or perennial herbs, with alternate or opposite leaves, and solitary or corymbed pedunculate heads which terminate the stem or branches. Involucre imbricated, leaf-like. Receptacle plane or convex, with persistent chaff which embraces the achenes. Rays few to many, neutral, yellow. Pappus of 2 or 4 chaffy scales, mostly deciduous. Achenes compressed or 4-angled.

* *Disk purple, purplish or brown; receptacle flat or convex.*

† *Ours annuals; leaves mostly alternate, the lower opposite.*

H. annuus L. *Common Sunflower.* Stem 2–10 feet high, usually much branched, hispid or scabrous; leaves mostly alternate, petioled, ovate or lower cordate, 3-nerved, serrate; involucral scales ovate or oblong, long-acuminate, ciliate; disk 1 inch or more across. Commonly cultivated and a common escape in waste places; infrequent in the wild state; July–September.

H. petiolaris Nutt. Stem simple or branched, 1–3 feet high, strigose-hispidulous; leaves ovate-lanceolate or oblong, slender-petioled, usually entire; involucral scales lanceolate or oblong-lanceolate, sometimes ciliate; tips mucronate or attenuate; disk about half an inch broad. Dry soil; July–August; rare; Dubuque and Muscatine counties.

† † *Perennial; leaves mostly opposite, the upper alternate.*

H. rigidus Desf. Stem 2–4 feet high, simple, sometimes branched, rigid, rough; leaves opposite, 3-nerved, nearly sessile, oblong-lanceolate or lower oval, entire or somewhat serrate, rigid, rough on both sides, tapering both ways; heads large, usually solitary, terminal; scales ovate or oblong, acute, or obtuse, ciliate, appressed; rays 15–25; disk dark. Prairies; August–September; frequent; Floyd, Hancock, Johnson, Winnebago, Decatur, Ringgold, Taylor, Page, and Fremont counties; reported from Fayette, Scott, Louisa, Story, Woodbury, Sioux, Lyon, Dickinson, and Emmet counties (*H. scaberrimus* Ell.)

* * *Disk yellow or yellowish; receptacle conic or convex; perennial.*

† *Leaves usually lanceolate, much longer than wide.*

‡ *Leaves mostly basal, the upper bract-like.*

H. occidentalis Riddell. Stem 2–3 feet high, somewhat hairy with runners from the base, simple, nearly leafless above; leaves oval; 3-nerved, lower on long hairy petioles, the upper small, nearly sessile and remote; heads small, 1–5, on long peduncles; scales lance-ovate, acute, often ciliate; disk yellow. Prairies; August–September; frequent; Winneshiek, Johnson, and Lee counties; reported from Clinton, Benton, Fayette, Henry, and Muscatine counties.

‡ ‡ *Leaves mostly cauline and alternate or opposite.*

§ *Stem scabrous, scabrate or hispid; leaves sessile or nearly so.*

H. giganteus L. Roots fleshy, rootstock creeping; stems hispid or scabrous, 3–10 feet high, simple or branched above; leaves sessile or short-petioled, lanceolate, scabrous above, hirsute beneath, denticulate or serrate, mostly alternate but sometimes opposite; heads several, long-peduncled; involucre hemispheric, the bracts lanceolate-subulate, ciliate or hirsute, squarrose. Reported as rare from Fayette county.

H. maximiliana Schrad. Stem 2–8 feet high, stout, hispidulous-scabrous; leaves alternate, some opposite, narrowly lanceolate, tapering both ways, subsessile, entire or nearly so, very scabrous on both sides; heads over medium size, terminating the stem or branches; scales long-attenuate; rays golden yellow. Prairies; August–September; infrequent; Emmet and Dubuque counties, reported from Floyd, Story, Buena Vista, Monona, Woodbury, Sioux, Lyon, and Dickinson counties.

⁜ Stem glabrous, glaucous, leaves petioled.

H. grosse-serratus Martens. Stem smooth, glaucous, 3–8 feet high, mostly simple; leaves opposite; petioled, long-lanceolate, long-pointed, sharply serrulate or denticulate, whiter and pubescent beneath; scales subulate; heads many, small, short-peduncled; rays 15–20. Low grounds; August–September; common.

† † Leaves ovate, ovate-lanceolate, or oblong.

‡ Leaves sessile, or nearly so.

H. mollis Lam. Stem 2–3 feet high, simple, hirsute; leaves ovate to lanceolate, acute or acuminate, 3-nerved, base cordate-clasping; heads few or solitary; involucre hemispheric, the bracts lanceolate, acuminate, villous-canescent, slightly spreading. Dry soil; August–September; reported as belonging to the flora of Iowa.

H. divaricatus L. Stem 2–7 feet high, glabrous or pubescent above; leaves usually opposite, divaricate, lanceolate or ovate-lanceolate, dentate or denticulate, rough above, pubescent beneath, apex long-acuminate, base truncate; scales narrowly lanceolate, hirsute or ciliate. Dry woodlands; July–September; specimens from Winneshiek, Fayette, and Henry counties have been referred to this species.

‡ ‡ Leaves petioled.

⁜ Stems glabrous or puberulent.

H. decapetalus L. Stem 1–5 feet high, slender, glabrous or nearly so, branches puberulent; leaves thin, ovate or ovate-lanceolate, sharply serrate, roughish above, more or less finely pubescent beneath, the lower opposite, slender petioled, the upper alternate, apex acuminate, base rounded or truncate and decurrent on the petiole; scales linear-lanceolate, acuminate, hirsute, ciliate, spreading. Moist woods; August–September; specimens from Floyd county have been referred to this species.

H. tracheliifolius Mill. Stem 3–6 feet high, roughish-pubescent; leaves ovate-lanceolate, short-petioled, 3-nerved at the base, green on both sides, rougher above, lower sharply serrate; scales linear-lanceolate, long-acuminate, puberulent, ciliate, larger than the disk, sometimes foliaceous. Borders; August–September; infrequent. Specimens from Fayette, Johnson, and Story counties are referred to this species.

H. strumosus L. Rootstock long and slender; stem 3–6 feet high, usually branching, smooth, often glaucous, the branches rarely hispidulous; leaves ovate-lanceolate, acuminate, abruptly contracted or tapering into margined petioles, entire or slightly serrate, rough above, whiter and often

downy beneath; scales ovate-lanceolate, acuminate or attenuate and spreading, ciliate. Borders of woods, August–September; common. The variety MOLLIS T. & G., has the leaves finely and densely canescent beneath and is reported from Story county. (*H. strumosus macrophyllus* (Willd.) Britton).

¼ ¼ Stem scabrous, hispid, or hirsute.

H. hirsutus Raf. Stem 2–4 feet high, hirsute; leaves petiolate, ovate-lanceolate, base abrupt or roundish, acuminate, more or less serrate, very rough above, usually rough-hairy beneath; scales ovate-lanceolate, acuminate. Often confounded with the preceding; August–September; frequent; Fayette, Van Buren, Decatur, and Ringgold counties; reported from Scott, Muscatine, Johnson, and Lee counties.

H. laetiflorus Pers. Stem 3–5 feet high, branched above, scabrous or hispid; leaves oval or oblong-lanceolate, acuminate both ways, more or less serrate, rough on both sides, thinner than the preceding; heads rather short-peduncled; scales in 2 or 3 rows, ovate to oblong-lanceolate, acuminate; rays numerous; disk yellow. Prairies; August–September; infrequent; Jackson, Muscatine, and Johnson counties; reported from Fayette and Story counties.

H. tuberosus L. *Jerusalem Artichoke.* Stem branching above, 4–8 feet high, pubescent or hirsute; leaves of the branches and upper part of the stem usually alternate, all oblong-lanceolate to ovate or subcordate, petioled, acuminate, coarsely serrate, scabrous above, shortly pubescent or cinereous beneath; scales lanceolate, attenuate. The variety SUBCANESCENS Gray, has the leaves densely white canescent beneath and is found in Fayette county. Moist soil; September; frequent; Winneshiek, Floyd, Henry, Van Buren, Decatur, Dickinson, and Winnebago counties; reported from Fayette, Muscatine, Lee, Story, Boone, Emmet, Cass, Woodbury, and Sioux counties.

ACTINOMERIS Nutt. Perennials, with simple or somewhat branched stems, and feather-veined decurrent leaves. Heads corymbed, many-flowered; rays yellow, few, neutral. Involucral scales foliaceous, nearly equal. Receptacle chaffy.

A. squarrosa Nutt. Stem 4–9 feet high, winged; leaves alternate or lower opposite, oblong or ovate-lanceolate, tapering both ways, more or less serrate; rays 2–8, irregular; achenes flat, obovate, broadly winged; pappus of 2–3 awns. Low woods; July–August; frequent in the eastern, southeastern, southern, and central counties; Johnson, Appanoose, Decatur, Ringgold, Page, and Fremont counties; reported from Scott, Muscatine, Des Moines, Henry, and Story counties. (*Verbesina alternifolia* (L.) Britton).

COREOPSIS L. TICKSEED. Annual or perennial herbs, with opposite leaves, and mostly yellow flowers. Involucre double, of about 8 scales to each part, outer foliaceous, more or less spreading, inner somewhat membranous, appressed. Receptacle flat, with deciduous chaff. Pappus commonly of 2 teeth or awns, barbed upwardly, sometimes wanting. Achenes flattened parallel with the involucral scales.

C. palmata Nutt. Perennial; stem 1–3 feet high, simple, rigid, glabrous; leaves sessile, rigid, 3-nerved at the base, cuneiform in outline, 3-cleft to or below the middle, rarely undivided; divisions linear, slightly narrower than the base, entire or 1–3 cleft; outer scales linear, equaling the inner, more or less united at the base. Prairies; June–July; common throughout the state.

C. tripteris L. Stem simple, 4–8 feet high, or corymbed above, smooth; leaves petioled, 3–5-divided, leaflets lanceolate, tapering both ways, entire; outer scales shorter, all united at the base. Woods; August–September; in-

frequent: Johnson, Muscatine, Story, Decatur, Ringgold, and Taylor counties.

BIDENS L. Annual herbs, with opposite variously cut or divided leaves, and yellow flowers. Involucre double, the outer usually foliaceous. Receptacle flat, chaffy. Rays 4–8, neutral, or none. Pappus of 2–4 awns, roughened backward. Achenes slender, quadrangular or flattened parallel with the involucral scales.

* *Plants terrestrial; leaves lanceolate, serrate, undivided, rarely lobed.*

† *Rays present, conspicuous, sometimes wanting in* B. cernua.

B. chrysanthemoides Mx. Stem 6–24 inches high, erect or reclining below; leaves sessile, lanceolate, tapering both ways, serrate, connate; heads erect; outer involucre shorter than the rays; achenes 2–4-awned. Wet places; August–September; common; Winneshiek, Johnson, Floyd, Story, Decatur, Winnebago, and Emmet counties; reported from Fayette, Muscatine, and Woodbury counties. (*B. laevis* (L.) B. S. P.)

B. cernua L. Stem 6–24 inches high, nearly smooth; leaves lanceolate, sessile, sometimes slightly connate, coarsely serrate; heads nodding, rays few or none; outer involucral scales longer than the head; achenes usually 4-awned. Wet places; July–September; common; Johnson and Decatur counties, reported from Fayette, Scott, Henry, Lee, Story, and Emmet counties.

† † *Rays rudimentary or none.*

B. comosa (Gray) Wiegand. Stem 1–3 feet high, straw-colored; leaves short-petioled, lanceolate, coarsely serrate, petioles broadly margined; outer involucral scales foliaceous, 2–4 times as long as the heads; corollas pale greenish yellow, mostly 4-lobed; pappus awns usually 3. Moist soil; August–September; probably common; Johnson and Decatur counties; reported from Fayette county. (*D. connata comosa* Gray). Probably confused with the following.

B. connata Muhl. *Swamp Beggar-ticks.* Stem 1–5 feet high, purple; leaves thicker and greener than in the preceding, lanceolate or oblong-lanceolate, coarsely serrate, petioled; involucral bracts not foliaceous; disk-flowers orange; achenes with 2–4 awns. Wet places; August–September, common; reported from Fayette, Johnson, Henry, and Story counties.

* * *Plants terrestrial leaves mostly 1–3-parted or dissected.*

† *Rays short, rudimentary, or none.*

B. frondosa L. *Beggar-ticks* Stem 2–4 feet high, branching, smooth or somewhat hairy; leaves petioled, 3–5-divided, divisions mostly stalked, lanceolate, serrate; outer involucral scales slender, much longer than the head, ciliate below; rays wanting; achenes with 2 long retrosely barbed awns. Moist ground; July–September; common.

† † *Rays large and conspicuous.*

B. aristosa (Mx.) Britton. Stem much branched, 1–3 feet high; leaves thin, pubescent beneath, slender petioled, the lower pinnately 5–7-divided, segments lanceolate, serrate, incised or pinnatifid, upper leaves less divided; involucral bracts glabrous or ciliate, short, the outer linear or spatulate, usually ciliate, not exceeding the inner; awns slender, 2, barbed, as long as the achene. Low grounds; August–September; reported from Muscatine and Benton counties. (*Coreopsis aristosa* Mx.)

B. involucrata (Nutt.) Britton. Stem 1–3 feet high, much branched, minutely pubescent; leaf-segments linear-lanceolate, long-acuminate, incised or pinnatifid; outer involucral bracts linear-lanceolate, hispid and ciliate,

much exceeding the inner ones; awns 2, short. Low grounds, waste places; July–September; common; Johnson and Decatur counties; confused with the preceding which it much resembles. (*Coreopsis involucrata* Nutt.)

* * * *Plants aquatic, submersed leaves filiformly dissected.*

B. beckii Torr. *Water Marigold.* Aquatic perennial This species was observed by Hitchcock in a pond in Story county in 1883 but no specimens were collected.

HELENIUM L. Erect branching perennials, with alternate decurrent leaves, and many-flowered radiate heads. Rays several, cuneate, fertile, 3–5-cleft. Involucral scales linear, reflexed. Receptacle convex to oblong, naked. Pappus of 5–9 one-nerved thin scales. Achenes turbinate, ribbed.

H. autumnale L. *Sneezeweed.* Stem 1–6 feet high, nearly smooth, narrowly wing-angled; leaves lanceolate, sessile, tapering both ways, toothed; disk and ray-flowers yellow. Pastures, preferring alluvial soil; August–September; common; Winneshiek, Allamakee, Clinton, Scott, Muscatine, Des Moines, Johnson, Floyd, Jefferson, Decatur, Taylor, Fremont, Hancock, Lyon, Dickinson, and Emmet counties; reported from Fayette, Story, Harrison, and Woodbury counties.

DYSODIA Cav. Annual or biennial herbs, dotted with large pellucid glands which exhale a strong odor. Leaves mostly opposite. Heads many-flowered, usually radiate; rays pistillate. Involucral scales in one row, partially united. Pappus of one row of scales dissected into capillary rough bristles. Achenes 4-angled.

D. chrysanthemoides Lagasca. *Fetid Marigold.* Stem 6–15 inches high, much branched, smooth; leaves pinnately parted, the divisions narrow, bristle-toothed or cut; heads with a few short rays. Roadsides and waste places. August–September; common; an emigrant from the west. (*D. papposa* (Vent.) A. S. Hitchcock).

ANTHEMIS L. Ours annual branching herbs, with 1–3-pinnately dissected leaves, and solitary terminal heads. Rays white, pistillate or in the first neutral; disk-flowers yellow. Involucral scales small, scarious, imbricated, shorter than the disk. Pappus wanting or a mere border. Achenes terete or ribbed.

A. cotula L. *Mayweed, Dog-fennel.* Stem about 1 foot high, nearly smooth, leaves finely 3-pinnately dissected; pappus none; an ill-scented herb. Roadsides and waste places; June–September; common.

A. arvensis L. *Corn Chamomile.* Similar to the preceding but not ill-scented; stem pubescent; pappus a mere border. This species has been found rarely in Story and Muscatine counties.

ACHILLEA L. Perennial herbs, with small corymbose heads, and alternate much divided leaves. Heads many-flowered; rays few, fertile. Involucral scales with scarious margins, imbricated. Receptacle convex or flattish, chaffy. Pappus wanting. Achenes oblong, flattened, margined.

A. millefolium L. *Common Yarrow or Milfoil.* Stem simple, 1–2 feet high; leaves 2-pinnately-parted; divisions linear, crowded, 3–5-cleft; heads in a flat-topped corymb; rays 4–5, short, white or rose color. Prairies, fields, and open woods; June–September; common.

CHRYSANTHEMUM L. Perennial herbs, with toothed, divided, or pinnatifid leaves, white fertile rays, and yellow disk flowers. Involucre broad, depressed, of many imbricated scarious-margined scales. Receptacle flat or convex, naked. Pappus wanting. Achenes striate, similar.

C. leucanthemum L. *Ox-eye or White Daisy.* Stem 1–2 feet high, simple or branched; lower leaves spatulate, petioled, more or less pinnatifid; upper leaves clasping, toothed; heads large, solitary, terminating stem or branches. Fields and waste places. June–September; infrequent but widely distributed; Allamakee, Dubuque, Johnson, Decatur, Page, and Cerro Gordo counties; reported from Muscatine, Story, Cass, Hardin, and Woodbury counties.

TANACETUM L. Strong-scented perennials, with alternate 1–3-pinnately dissected leaves, and corymbose yellow discoid heads. Involucre hemispherical; the scales small, imbricated. Receptacle convex. Pappus a mere border. Achenes angled or ribbed, terminated by a large flat disk.

T. vulgare L. *Common Tansy.* Stem 2–3 feet high, smooth; leaflets oblong-lanceolate, cut-toothed or pinnatifid; pistillate flowers tubular, with an oblique 3-toothed limb; pappus 5-lobed. Along roadsides and in waste places; August–September; infrequent; Winneshiek, Allamakee, Johnson, and Decatur counties; reported from Fayette and Story counties.

ARTEMISIA L. Wormwood. Annual, biennial or perennial plants with entire, toothed, lobed, or dissected, alternate leaves, and nodding heads which are in panicled spikes or racemes. Involucre obovoid, imbricated, of dry connivent scales. Receptacle small, naked. Heads discoid; flowers few to many, tubular, perfect, or the marginal pistillate. Pappus wanting. Achenes obovoid, capped by a small disk.

* *Marginal flowers pistillate and fertile; disk-flowers perfect but sterile.*

† *Leaves pinnately dissected into narrowly linear lobes.*

A. caudata Mx. Biennial, stem smooth, simple, 2–4 feet high; leaves 1–3-pinnately divided; the segments alternate, filiform; heads small, globose, numerous, in an elongated panicle. Sandy soil, August–September; common locally; Winneshiek, Muscatine, Johnson, Cerro Gordo, Emmet, Winnebago, and Lyon counties; reported from Fayette and Story counties.

A. canadensis Mx. Biennial or perennial; stem 1–2 feet high, pubescent or glabrous; leaves usually pubescent, the lower petioled and 2-pinnately divided into linear lobes, upper leaves sessile, less divided; heads short-peduncled, in narrow panicles, usually numerous. Dry soil; July–August; reported from Woodbury and Lyon counties.

† † *Leaves linear, entire or the lower 3-cleft.*

A. dracunculoides Pursh. Perennial, stem 3–4 feet high, glabrous or canescent when young, branched; leaves linear, entire or lower trifid; heads small, numerous, in an open panicle. Dry or prairie soil; August–September; frequent; Winneshiek, Floyd, Muscatine, Hancock, Dickinson, and Emmet counties; reported from Fayette and Story counties.

* * *Flowers all fertile, the marginal pistillate; receptacle hairy.*

A. frigida Willd. Whole plant silky-canescent; stems in tufts, 6–15 inches high; leaves pinnatifid; segments linear, 3–5-cleft; heads small, globose, drooping, racemose. Sterile soil; July–September; infrequent; Lyon county.

A. absinthium L. *Common Wormwood.* Shrubby, finely canescent; stems 1–4 feet high, much branched; leaves 1–3-pinnately divided into obovate or oblong obtuse lobes, lower long petioled, the upper short-petioled or sessile, the uppermost linear and entire; heads many, drooping, yellow, short-peduncled, racemose-paniculate. Reported from Fayette county as a rare escape.

* * * *Flowers all fertile, the marginal pistillate; receptacle smooth.*

† *Leaves dissected.*

A. annua L. Stem 1–4 feet high, branching, glabrous, leaves 2–3-pin-

nately dissected, segments oblong, deeply pinnatifid; heads small, in an ample panicle. Waste places; July–September; infrequent. Muscatine and Decatur counties; reported from Keokuk county.

A. biennis Willd. Biennial; stem simple, erect, 1–4 feet high, glabrous; leaves 1–2-pinnately divided; divisions linear, entire or cut-toothed; heads globular, erect, in axillary spikes, collectively in a narrow leafy panicle. Dry soil; August–September; frequent.

†† *Leaves serrate or entire, not pinnatifid.*

A. serrata Nutt. Perennial; stem leafy, 5–9 feet high; leaves lanceolate, serrate, whitened beneath, the upper often linear; heads small, few-flowered, greenish. Bottom lands; August–September; frequent; Winneshiek, Jackson, and Muscatine counties; reported from Fayette, Poweshiek, Story, Winnebago, and Cerro Gordo counties.

A. gnaphalodes Nutt. Perennial; whole plant woolly-canescent; stem 2–4 feet high, branched; leaves lanceolate, entire, or lower toothed or pinnatifid, upper surface usually glabrate and green; heads ovoid, small, mostly sessile, in narrow leafy panicles. Sandy and prairie soil; August–September; common. (*A. ludoviciana gnaphalodes* T. & G.)

SENECIO L. Herbs, with alternate leaves, solitary or corymbed heads, and mostly yellow flowers. Heads many-flowered; flowers all tubular and perfect or else the marginal ligulate and pistillate. Involucre of many equal erect-connivent scales, sometimes with a few bractlets at the base. Receptacle flat, naked. Pappus of copious soft capillary bristles.

S. aureus L. *Golden Ragwort.* Perennial; stems 1–3 feet high, glabrous or woolly when young; radical leaves thin, simple, orbicular or ovate-oval, crenate-toothed, long-petioled; lower lyrate-pinnatifid; upper sessile or partly clasping, dentate or incised; rays 8–12. Wet woods and meadows; May–June; Johnson county; reported from Winneshiek, Fayette, Story, and Woodbury counties; perhaps frequent and widely distributed but has been confused with the following.

S. balsamitae Muhl. Stems a few inches to two feet high; radical leaves oblong or spatulate, varying to lanceolate, tapering to the petiole, serrate, upper lanceolate, laciniate or pinnatifid, petioled or the uppermost sessile. Dry and rocky woods; May–July; common; Winneshiek, Allamakee, Scott, Johnson, Decatur, and Shelby counties; reported from Fayette, Muscatine, and Story counties. (*S. aureus balsamitae* T. & G.)

S. obovatus Muhl. Stems 1–2-feet high; leaves rather thick, the basal obovate or spatulate, very obtuse, base cuneate, crenate-dentate, with short margined petioles, or the earliest nearly sessile in rosulate tufts; stem leaves few, sessile, oblong to spatulate, incised or pinnatifid. Wet prairies; April–June; reported from Story county. (*S. aureus obovatus* T. & G.)

S. lugens Richards. Stem stout, 1–3 feet high; basal and lower leaves oblong, oval or slightly spatulate, denticulate, narrowed into margined petioles, upper leaves sessile, bract-like; heads corymbose; involucral scales lanceolate or oblong-lanceolate, with black tips. Moist soil; June–August; reported from Plymouth county.

S. palustris Hook. Annual or biennial; stem 6–20 inches high, woolly or villous, sometimes at length glabrate; leaves oblong-lanceolate, toothed or laciniate, the upper cordate clasping; involucre naked below; rays many, pale yellow; pappus copious. Wet ground; June–August; Emmet, and Cerro Gordo counties; reported from Dickinson county.

CACALIA L. INDIAN PLANTAIN. Tall perennials, with alternate leaves, and discoid heads in flat corymbs. Flowers white or whitish, all tubular; corolla deeply 5-cleft. Involucre cylindric, the scales in one row, erect-connivent, with a few bractlets at the base. Pappus of capillary bristles.

* *Heads 25–30-flowered.*

C. suaveolens L. Stem 3–5 feet high, glabrous, grooved; leaves triangular-lanceolate, halberd-shaped, acuminate, serrate, wing-petioled. Woods; August–September; infrequent: Winneshiek, Fayette, and Muscatine counties; reported from Jackson and Scott counties. (*Synosma suaveolens* (L.) Raf.)

* * *Heads 5-flowered; involucre of 5 scales.*

C. reniformis Muhl. Stem 3–8 feet high, angulate, grooved, not glaucous, leaves green on both sides, lower leaves reniform, very large, long-petioled, upper dilated fan-shaped, toothed and angled, palmately-veined, petioled. Rich woods; July–September; infrequent; Winneshiek, Allamakee, and Johnson counties; reported from Fayette county. (*Mesadenia reniformis* (Muhl.) Raf.)

C. atriplicifolia L. Stem terete; 3–5 feet high, grooved, glaucous; leaves palmately-veined and angulately-lobed, toothed, petioled, glaucous beneath; lower triangular-reniform, or slightly cordate. Rich woods; August–September; frequent; Muscatine, Johnson, Jefferson, Henry, Des Moines, Van Buren, Decatur, Union, Ringgold, Taylor, Page, Fremont, and Pottawattamie counties. (*Mesadenia atriplicifolia* (L.) Raf.)

C. tuberosa Nutt. Stem grooved and angled, 2–6 feet high, glabrous, from a tuberous root; leaves oval or oblong, entire or obscurely toothed, thick, 5–7-nerved; lower with long petioles, upper with short margined petioles. Wet prairies; June–August; frequent; Allamakee, Fayette, Johnson, Appanoose, Decatur, Union, Adams, Ringgold, Taylor, Page, Pottawattamie, Shelby, Hancock, Winnebago, Cerro Gordo, Dallas, Webster, and Emmet counties; reported from Scott, Story, and Woodbury counties. (*Mesadenia tuberosa* (Nutt.) Britton).

ERECHTITES Raf. Ill-scented annuals, with alternate simple leaves, and paniculate-corymbed discoid heads of whitish flowers. Involucre cylindrical, of linear scales, in one row, with a few bractlets at the base. Flowers many, all tubular, fertile, the marginal pistillate, the central perfect. Pappus of soft capillary bristles.

E. hieracifolia (L.) Raf. *Fireweed.* Stem grooved, 1–4 feet high, often hairy; leaves lanceolate, or oblong, acute, unequally toothed, sessile, upper auricled. Rich open woods and burnt clearings; August–September; frequent; Winneshiek, Johnson, Des Moines, Lee, Decatur, and Calhoun counties; reported from Fayette and Story counties.

ARCTIUM L. Biennial herbs, with large petioled alternate leaves, and solitary or clustered discoid heads. Involucral scales numerous, imbricated, long-attenuated, with hooked tips. Heads globose, many-flowered; flowers tubular, perfect. Receptacle bristly. Pappus of numerous, rough, deciduous bristles. Achenes oblong, flattened.

A. minus Schk. *Burdock.* Stem 2–4 feet high, branched; leaves thin, broadly ovate, with a cordate base, or lanceolate with a cuneate base, smooth above, pale-canescent beneath; heads many, racemose on the branches, short-peduncled or sessile, about half an inch broad, inner bracts not exceeding the

pink-purple flowers. Waste and cultivated grounds; July–October; common. (*A. lappa minus* Gray.)

CNICUS L. THISTLE. Biennials or perennials, with sessile alternate leaves, and large terminal discoid heads. Involucre ovoid or spherical; scales numerous, spinous-tipped or unarmed, in many rows. Receptacle bristly. Flowers tubular, perfect. Style nearly undivided. Pappus copious, plumose, deciduous. Achenes oblong, compressed, smooth.

C. lanceolatus (L.) Willd. *Common T.* Stem 2–4 feet high; leaves sessile, decurrent, pinnatifid, hairy above, white-woolly beneath, lobes spiny; heads purple; scales lanceolate, spreading, all tipped with a spine. Waysides and pastures; July–September; common. (*Carduus lanceolatus* L.)

C. altissimus (L.) Willd. Stem 2–6 feet high; leaves oblong-ovate to lance-oblong, rough-hairy above, white-woolly beneath, undivided to sinuate-toothed, or sinuate-pinnatifid, lobes or teeth prickly; heads large; scales lance-ovate, outer with spreading spines; flowers purple. Fields and open woods; August–September, common. (*Carduus altissimus* L.) The variety FILIPENDULUS Gray, is 2–3 feet high; roots tuberous; leaves deeply pinnatifid. Emmet county; reported from Cass, Cherokee, Palo Alto, and Woodbury counties.

C. discolor Muhl. Similar to the preceding; leaves deeply pinnatifid into lanceolate or linear segments. Fields and borders; July–September; reported common. Variable and seems to pass into the preceding. (*Cnicus altissimus discolor* Gray. *Carduus discolor* (Muhl.) Nutt.)

C. hillii Canby. Stem 1–2 feet high, simple or branched; root fusiform; leaves green on both sides, lobed or pinnatifid; lobes rounded, dentate or prickly; lower leaves spatulate-oblong, narrowed to the base or petioled, the upper oblong, sessile and clasping; outer involucral scales ovate-lanceolate, tipped with short bristles, very glutinous on the back, inner narrowly lanceolate and acuminate. Fields; June–July; reported from Story county (*Carduus hillii* (Canby) Porter).

C. arvensis (L.) Hoffm. *Canada T.* Perennial, stem 1–2 feet high, with a long running root; leaves oblong-lanceolate, sinuate-pinnatifid, prickly, smooth or slightly woolly beneath; heads small; flowers rose-purple, imperfectly diœcious; scales triangular, appressed, minute, prickly-pointed. Cultivated fields; infrequent but widely distributed. (*Carduus arvensis* (L.) Robs.)

AMBROSIACEAE *Reichenb.* RAGWEED FAMILY.

Annual or perennial herbs, mostly of a weedy aspect, with alternate leaves, or the lower opposite, and small heads of greenish or whitish, monœcious or diœcious flowers. Staminate and pistillate flowers in the same head, or in separate heads. Involucral scales few, separate or united. Receptacle chaffy. Corolla wanting in the pistillate flowers or reduced to a short tube or ring; the calyx-limb none or a mere border; style 2-cleft. Corolla in the staminate flowers tubular, funnelform, or obconic, 4–5-lobed; stamens usually 5, separate, or the anthers merely connivent. A family often included in the COMPOSITAE from which it is mostly distinguished by the anthers not being truly syngenesious.

* *Staminate and pistillate flowers in the same heads.*

IVA. Represented in our flora by a single species.

** *Staminate and pistillate flowers in separate heads.*

AMBROSIA. Involucral bracts of the staminate heads united.

XANTHIUM. Involucral bracts of the staminate heads separate; involucre of the pistillate heads closed, covered with hooked spines.

IVA L. Herbaceous or shrubby plants, with opposite or alternate leaves, and small nodding greenish-white discoid heads. Fertile and sterile flowers in the same head. Anthers nearly separate. Involucral scales 3–9, roundish. Receptacle small, chaffy. Achenes obovoid or lenticular.

I. **xanthiifolia** (Fresen.) Nutt. *Marsh Elder.* Annual, stem tall, 4–10 feet high, roughish; leaves mostly opposite, petioled, ovate, rhombic or cordate, lobed, doubly serrate or cut toothed, hoary; flowers in terminal or axillary panicled spikes, bracts not obvious; fertile flowers 5, corolla rudimentary or wanting. Waste grounds; July–September; common in the western counties but less frequent eastward.

AMBROSIA L. Annual or perennial herbs, with opposite or alternate lobed or pinnatifid leaves, and inconspicuous greenish flowers in spike-like racemes. Flowers monœcious; fertile 1–3 together, axillary, near the base of the raceme; the involucre oblong, closed, achene-like; pistil with 2 long protruding styles; stamens wanting; sterile flowers many, surrounded by a depressed hemispherical cup formed from united scales. Anthers nearly separate. Pappus wanting. Achenes ovoid.

* *Leaves opposite, palmately lobed or undivided; receptacle naked.*

A. **trifida** L. *Great Ragweed.* Annual; stem stout, 3–12 feet high, hairy; leaves opposite, petioled, hairy, deeply 3-lobed, lobes oval, long-pointed, serrate; petioles margined; fruit obovate, 5–6 ribbed, and tubercled. Low grounds; July–September; common. The variety INTEGRIFOLIA T. & G., a smaller form, has ovate undivided leaves. This and intermediate forms are frequently found.

** *Leaves opposite and alternate, pinnatifid; receptacle chaffy.*

A. **artemisiaefolia** L. Annual; stem 1–3 feet high, much branched, hairy or rough-pubescent; leaves opposite or alternate, thin, mostly twice pinnatifid, smooth above, hoary beneath; petioles ciliate; fruit obovoid or globular, armed with 6 short teeth. Fields and waste places; July–September; common.

A. **psilostachya** DC. Perennial with slender running rootstocks; stem 2–4 feet high, paniculately branched, whitish, hispid; leaves thickish, mostly once pinnatifid; fruit obovoid, tubercles small or wanting. Low grounds and prairies; July–September; common in western Iowa, rare eastward; Fremont, Decatur, and Johnson counties; reported from Pottawattamie, Story, Fayette, and Muscatine counties.

XANTHIUM L. Annuals, with alternate petioled leaves, and monœcious heads of flowers. Fertile flowers in clusters, the sterile in racemes above. Sterile involucres of separate scales; receptacle cylindric. Fertile involucre closed, coriaceous, covered with hooked prickles, 2-celled, 2-flowered. Pappus wanting. Corolla thread-form. Anthers nearly separate. Achenes oblong, flat.

X. **canadense** Mill. *Cocklebur.* Stem 1–3 feet high, frequently brown spotted; leaves ovate or cordate, 3-nerved, dentate, frequently lobed; fruit about 1-inch long, densely prickly, beaks hooked or incurved. Fields and waste places; July–September; common.

CICHORIACEAE *Reichenb.* CHICORY FAMILY.

Herbs, usually with acrid or milky juice, alternate or basal leaves, and yellow, blue, purple, or white flowers in involucrate heads. Involucral bracts in one to several series. Receptacle flat or flattish, scaly, smooth, pitted, or alveolate. Flowers all alike, perfect. Calyx-tube adnate to the ovary, the limb of scales, or bristles, or both, or wanting. Corolla gamopetalous, ligulate; tube short or long; ray usually 5-toothed. Anthers 5, united into a tube around the style, sagittate or auricled below, usually appendaged above. Ovary 1-celled, 1-ovuled; style 2-cleft or 2-lobed. Fruit an achene. This family is usually regarded as a tribe of the COMPOSITAE and is also known as LIGULIFLORAE.

* *Pappus of scales, or of scales and bristles.*

CICHORIUM. Flowers blue or white; involucre double; pappus of blunt scales.

KRIGIA. Flowers yellow; involucre simple; pappus of chaff and bristles.

** *Pappus plumose.*

TRAGOPOGON. Stems leafy; involucre simple; plume branches of the pappus interwebbed

*** *Pappus of capillary bristles, not plumose.*

† *Achenes cylindric, prismatic or terete, not flattened.*

‡ *Achenes not beaked.*

HIERACIUM. Flowers yellow or orange, sometimes red; pappus tawny.

PRENANTHES. Flowers white, cream-color, or purple; pappus tawny or brown; heads often nodding.

LYGODESMIA. Flowers pink or purple; pappus white; heads erect.

‡ ‡ *Achenes beaked, sometimes beakless in Troximon; flowers yellow; heads solitary, scapose.*

TROXIMON. Involucre loosely imbricated; achenes 10-ribbed.

TARAXACUM. Involucre calyculate; achenes 1-5-ribbed.

† † *Achenes flat or flattish; pappus white; involucre imbricated; heads panicled.*

LACTUCA. Flowers yellow or purplish; achenes more or less beaked.

SONCHUS. Flowers yellow; achenes flattish, beakless.

CICHORIUM L. Erect branching perennials, with deep roots, alternate and basal leaves, and axillary and terminal heads. Involucre of two series of herbaceous bracts. Receptacle flat, naked, or slightly fimbrillate. Achenes 5-angled or 5-ribbed, truncate, beakless. Pappus of 2 or 3 short blunt scales, forming a crown.

C. intybus L. *Chicory.* Basal leaves on the ground, runcinate-pinnatifid, narrowed to long petioles; stem-leaves lanceolate or oblong, lobed or entire, base clasping and auricled; heads many. Waste places; July–September; reported from Fayette, Scott, Polk, Adams, and Woodbury counties.

KRIGIA Schreber. Ours a perennial, with scape-like stems, mostly radical leaves, and several to many-flowered heads. Involucral scales in 2 rows. Pappus double, the outer of scales, the inner capillary.

K. amplexicaulis Nutt. Roots fibrous; stem 1–2 feet high, smooth, with 1–2 leaves; cauline leaves sessile, clasping, oblong or oval, mostly entire; radical on winged-petioles, entire or toothed, rarely pinnatifid; heads 2–5, peduncled. Rich woods; May–June; frequent; Winneshiek, Allamakee, Jones, Muscatine, Johnson, Henry, Lee, and Cerro Gordo counties, reported from Fayette and Scott counties. (*Tragopogon virginicum* L. *Adopogon virginicum* (L.) Kuntze).

K. dandelion (L.) Nutt. Scape slender, leafless, with a solitary head, 6–18 inches high; roots tuberiferous; leaves basal, tufted, linear-lanceolate to

spatulate, entire, denticulate, sinuate, or pinnatifid. Moist soil; April–June; reported from Woodbury county.

TRAGOPOGON L. Glabrous biennials, rarely perennials, from long descending roots, with elongated-linear, nervose, entire, clasping leaves, and solitary heads of yellow or purple flowers. Involucre simple, of several large equal lanceolate acuminate scales. Pappus plumose. Achenes narrow, striate, with a long filiform beak.

T. pratensis L. *Goat's-beard.* Stem 1–3 feet high, bases of the leaves expanded; flowers yellow; peduncle scarcely thickened. Fields; May–June; infrequent; Dickinson county; reported from Fayette, Johnson, Jasper, and Story counties.

T. porrifolius L. *Oyster-plant.* Flowers violet-purple; peduncle thickened and hollow. Reported from Story county.

HIERACIUM L. HAWKWEED. Perennials, with alternate leaves, and few to many heads of yellow orange or red lowers. Involucre more or less imbricated. Pappus tawny, of capillary bristles. Achenes striate, oblong or cylindrical.

H. canadense Mx. Stems 1–3 feet high, leafy, erect, pubescent to nearly smooth, corymbed above; leaves sessile, ovate-oblong to lanceolate, entire or with a few remote teeth; involucre regularly imbricated; heads large, many-flowered; pappus of numerous unequal bristles; achenes brown, cylindrical. Upland woods and prairies; August–September; infrequent; Emmet, Winneshiek, Fayette, Floyd, Muscatine, Johnson, and Winnebago counties.

H. scabrum Mx. *Rough Hawkweed.* Stem hirsute, 2–3 feet high; leaves obovate to oval, hairy, sessile, nearly entire; heads small, corymbose, many-flowered; involucre scarcely imbricated; pedicles and involucre clothed with dark glandular bristles; achenes red, cylindrical. Dry upland woods; August; infrequent; Muscatine, Johnson, Appanoose, Decatur, and Ringgold counties; reported from Fayette and Story counties.

H. longipilum Torr. *Long-bearded H.* Stem 1–4 feet high, clothed with long erect shaggy hairs, leafy below, naked above; leaves oblong-lanceolate or spatulate, entire, sessile, hairy like the stem; heads in a small racemed panicle; achenes narrowed at the apex. Prairies; July–August; infrequent; Muscatine, Decatur, and Taylor counties; reported from Story county.

H. aurantiacum L. Stem 6–20 inches high, usually leafless, hirsute; basal leaves spatulate or oblong, entire or denticulate; flowers orange or red. Waste places; reported from Story county.

PRENANTHES L. Perennials, with alternate leaves, and racemose-paniculate mostly nodding heads. Involucre cylindrical; scales linear, several, in one row, with a few bractlets at the base. Receptacle naked. Pappus of rough capillary bristles, brownish or straw color, copious. Achenes not beaked, linear-oblong, striate.

* *Bracts of the involucre hirsute-pubescent.*

P. aspera Mx. Stem 2–4 feet high, rough-pubescent to smoothish; leaves oval-oblong or lanceolate, dentate to nearly entire, sessile, not clasping; heads mostly erect, in small clusters, disposed in a long thyrsus; flowers yellowish cream-color. Upland woods and prairies; August–September; infrequent; Scott, Emmet, Decatur, and Ringgold counties; reported from Fayette, Muscatine, and Story counties. (*Nabalus asper* (Mx.) T. & G.)

P. racemosus Mx. Stem 2–4 feet high, simple, smooth, glaucous; leaves oval or oblong-lanceolate, smooth, denticulate, lower tapering to winged

petioles, upper clasping; thyrsus 4–20 inches long; involucre hirsute; flowers purplish. Low prairies; August–September; frequent; Emmet, Hancock, Floyd, and Lyon counties; reported from Fayette and Story counties. (*N. racemosus* (Mx.) DC.).

P. crepidinea Mx. Stem 4–8 feet high, branched above; glabrous or minutely pubescent; leaves ample, ovate, triangular-ovate or hastate, toothed, wing-petioled; heads nodding, in loose clusters, corymbosely-paniculate, involucre hirsute; flowers cream-color. Woods; August–September; rare; Johnson county. (*N. crepidineus* (Mx.) DC.)

** *Bracts of the involucre glabrous or sparingly hirsute.*

P. alba L. Stem 2–4 feet high, smooth, purplish, corymbosely-paniculate above; leaves angulate or deltoid-hastate, sinuate toothed, on long slender margined petioles; heads nodding, involucral scales about 8, purplish; pappus reddish-brown. Upland woods; August–September; frequent; Winneshiek; Clayton, Floyd, Jackson, Lee, and Winnebago counties; reported from Fayette, Scott, Muscatine, Story, and Emmet counties.

LYGODESMIA D. Don. Perennials, with rush-like stems, linear-subulate leaves, and long peduncled rose colored flowers. Involucre cylindrical, elongated. Pappus whitish, soft, copious. Achenes striate, terete.

L. juncea (Pursh) D. Don. Stem about one foot high, much branched, striate, from a deep-rooted base, nearly leafless; leaves small, lance-linear, the upper minute, subulate; heads 5-flowered; involucre about a half inch high. Fields and waste places; June–August; common in western Iowa; Emmet, Lyon, Shelby, Fremont, and Dickinson counties; reported from Sioux, Woodbury, Harrison, Monona, and Ida counties.

TROXIMON Nutt. Perennials, with tufted root leaves, and simple scapes bearing a solitary head of yellow flowers. Involucre campanulate; scales lanceolate or ovate, in 2 or 3 rows, pointed. Pappus white, copious, capillary. Achenes linear-oblong, about 10-ribbed, beakless.

T. cuspidatum Pursh. Scape 4–10 inches high, from a thick fusiform root; leaves elongated linear-lanceolate, tapering both ways, woolly-margined; head solitary, large, many-flowered. Prairies; April–May; infrequent; Shelby, Emmet, Calhoun, Marshall, Johnson, and Lyon counties; reported from Fayette, Scott, and Story counties. (*Nothocalais cuspidata* (Pursh) Greene).

TARAXACUM Haller. Stemless perennials, with lyrate-pinnatifid root-leaves, and yellow flowers. Heads solitary, many-flowered. Involucre double; the outer of short small scales, reflexed; the inner linear, much longer, in one row, appressed. Receptacle naked. Pappus white, capillary, copious.

T. officinale Weber. *Common Dandelion.* Scapes 4–18 inches high, hollow, from a thick descending root. Involucre reflexed at maturity of the fruit, exposing the achenes and globular head of pappus to the wind. Achenes ovate-oblong to fusiform, apex prolonged into a slender beak which is 2 or 3 times the length of the achene. Fields and waste places; mostly April and May but many appearing until the close of September; common.

LACTUCA L. LETTUCE. Annual, biennial, or perennial herbs, with leafy stems, panicled heads, and yellow, blue, or white flowers. Heads few- to many-flowered. Rays truncate, 5-toothed. Involucre glabrous, cylindrical, imbricated in two or more unequal rows. Pappus white, rarely tawny, soft, capillary, copious. Achenes flattened parallel with the scales, abruptly beaked, 3–5-ribbed.

* *Leaves spiny-margined; the midribs spiny or hispid; flowers yellow.*

L. scariola L. *Prickly L.* Stem 2–5 feet high, prickly below, glabrous above; leaves lanceolate to oblong or oblanceolate, sagittate-clasping, spinulose-denticulate or sinuate-toothed, midrib prickly; achenes obovate oblong, striate-nerved, beak slightly longer than the achene. Waste ground; July–September; becoming frequent throughout the state.

L. ludoviciana (Nutt.) DC. Stem 2–5 feet high, branched, glabrous, leafy; leaves oblong to ovate-oblong, acute, auriculate-clasping, spinulose-denticulate, sinuate-lobed or pinnatifid; heads many, loosely paniculate; flowers yellow; achenes oval or obovate, flat, about the length of the filiform beaks. River banks; July–September; reported from Muscatine, Emmet, Story, and Winnebago counties.

* * *Leaves neither spiny-margined nor with spiny midribs; sometimes spinulose in* L. integrifolia.

‡ *Achenes thin, flat; beaks filiform; flowers yellow, blue in* L. pulchella.

L. canadensis L. *Wild L.* Stem 3–8 feet high, strict, smooth, glaucescent, leaves long, sinuate pinnatifid, pale beneath, the margins entire or sparingly dentate, midrib naked or sparsely bristly; achenes oval, 1-nerved, beak slightly shorter. Rich soil; fields and open places; July–September; common.

L. hirsuta Muhl. Stem 2–3 feet high, reddish, somewhat hairy; leaves mostly runcinate pinnatifid, hairy on both sides, or midrib hairy, denticulate. Forms from Winneshiek county possessing the above characters are referred to this species.

L. integrifolia Bigelow. Stem 3–4 feet high, smooth, paniculately-branched above; leaves undivided, oblong, oblong-lanceolate or lanceolate, acuminate, denticulate or entire, auriculate-clasping; flowers yellow or purplish; achenes oval, longer than the beak. Rich soil; August–September; infrequent; Decatur, Taylor, and Ringgold counties; reported from Dickinson county. (*L. sagittifolia* Ell.)

L. pulchella (Pursh) DC. Perennial, glabrous, somewhat glaucous; stem slender, 1–3 feet high, branched above; leaves linear-lanceolate, lanceolate, or oblong, acute, entire, dentate, lobed or pinnatfid, the cauline sessile or partly clasping, the lower sometimes petioled; heads many, rays bright blue or violet; achenes oblong-lanceolate, twice the length of the tapering beaks. Fields and waysides; June–September; common in western Iowa, infrequent elsewhere; Fremont, Montgomery, and Pottawattamie counties; reported from Lee, Henry, Poweshiek, Story, Kossuth, and Woodbury counties.

† † *Achenes thickish, beakless or with short necks; flowers blue.*

L. acuminata Gray. Stem glabrous, 2–6 feet high; leaves ovate-oblong or oblong-lanceolate, frequently sagittate or hastate, simply or doubly toothed, acuminate, wing-petioled; achenes beakless. Open woods; August–September; frequent; Clayton, Dubuque, Johnson, Des Moines, and Decatur counties. (*L. villosa* Jacq.)

L. floridana (L.) Gaertn. Stem 4–8 feet high, smooth; leaves large, wing-petioled, deeply lyrate-pinnatifid, lobes simply or doubly dentate, lateral lobes ovate, terminal deltoid, acuminate; flowers blue; involucre about one-half inch high; pappus bright white; achenes thickish, acuminate, short-beaked. Rich soil, woods; August–September; frequent.

L. leucophaea Gray. Stem 3–12 feet high, glabrous; leaves deeply lobed or pinnatifid, dentate, teeth mucronate-pointed, sessile or the lower petioled, glabrous, sometimes pubescent on the veins beneath; panicle large, rather dense; heads many; rays blue; achenes oblong; compressed, short beaked;

pappus brown. Moist woods; July–September; reported from Fayette and Story counties. (*L. spicata* (Lam.) Hitchcock).

SONCHUS L. Ours coarse annuals, with mostly smooth and glaucous leafy stems and corymbose-paniculate heads of yellow flowers. Leaves spinulosely or ciliately dentate, auriculate-clasping. Involucre more or less imbricated, of unequal scales. Pappus soft, white, copious, capillary. Achenes compressed, striate or ribbed.

S. asper (L.) All. Stem smooth, 1–4 feet high; leaves rarely runcinate-pinnatifid, usually undivided, the basal and lower obovate or spatulate, petioled, the upper oblong or lanceolate very spiny-toothed, auricles rounded; achene smooth margined, 3-ribbed on each face. Waste places; July–September; frequent throughout the state.

S. oleraceus L. Stem 2–3 feet high; leaves runcinate-pinnatifid, rarely undivided, with soft spiny or prickly teeth, auricles acute; achenes many-striate, rugulose-scabrous. With the preceding; infrequent; Johnson county; reported from Winneshiek, Clayton, Fayette, Scott, Muscatine, Linn, and Story counties.

CAMPANULACEAE *Juss.* BELL FLOWER FAMILY.

Herbs, with milky juice, alternate exstipulate leaves, and solitary racemose paniculate or spicate flowers. Calyx persistent, 5-lobed or 5-parted, adherent to the ovary. Corolla regular or irregular, 5-lobed. Stamens 5, separate or connate; anthers 2-celled. Capsule 2–several-celled, many-seeded.

* *Corolla regular; anthers separate.*

CAMPANULA. Flowers complete; corolla bell-shaped, rarely rotate.

SPECULARIA. Early flowers cleistogamous; corolla rotate.

** *Corolla irregular; anthers connate.*

LOBELIA. Our only genus.

CAMPANULA L. Calyx-tube short. Corolla for the most part campanulate. Stamens 5; filaments flattened. Stigma 3-lobed. Capsule 3 celled.

C. americana L. *Tall Bell-flower.* Annual, somewhat hairy; stem 3–6 feet high; leaves ovate-lanceolate, taper-pointed, thin, serrate, petioles margined; inflorescence spicate, 1–2 feet long, flowers sessile, axillary; calyx-lobes long, narrow; corolla light blue, broad; style exserted, declined and curved upwards. Rich soil, woods and fields; July–August; common.

C. rotundifolia L. *Harebell.* Perennial; stem 6–14 inches high, branching, weak, mostly glabrous; radical leaves long-petioled, ovate or reniform-cordate, entire or dentate, soon perishing; cauline leaves linear, entire; flowers on slender pedicels, nodding; calyx-lobes subulate; corolla campanulate, blue. A delicate plant. Rocky woods; June–July; common in northeastern portion of the state; Winneshiek, Allamakee, Clayton, Dubuque, Jackson, Jones, Webster, and Emmet counties; reported from Fayette and Scott counties.

C. aparinoides Pursh. Stem weak, somewhat angular, branched, rough on the angles; leaves linear, mostly entire; flowers on long slender pedicels; calyx-lobes short, triangular; corolla white, campanulate. Wet places; June–August; frequent; Winneshiek, Fayette, Muscatine, Johnson, Hancock, Cerro Gordo, Winnebago, and Emmet counties; reported from Scott and Story counties.

SPECULARIA Heister. Calyx-tube elongated. Corolla rotate. Filaments hairy, shorter than the anthers. Stigmas and cells of the angular capsule 3.

* **S. perfoliata** (L.) A. DC. *Venus Looking-glass.* Annual, stem simple, 5–20 inches high, erect; leaves cordate-clasping, somewhat reniform, crenate; flowers sessile, usually 2–3 in the axils of the upper leaves, corolla conspicuous in but few flowers. Fields and woods; May–August; common. (*Legouzia perfoliata* (L.) Britton).

LOBELIA L. Flowers in some form of a bracted raceme. Corolla tubular, deeply cleft on the upper side, 2-lipped, upper lip 2-lobed, lower 3-lobed. Stamens 5; anthers and usually the filaments united into a curved tube, 2 of the anthers bearded. Style 1. Capsule 2-celled, containing many small seeds, opening loculicidally.

** Flowers red or scarlet.*

L. cardinalis L. *Cardinal-flower.* Stem 2–4 feet high, simple, glabrous, leafy; leaves oblong-lanceolate, tapering both ways, shortly toothed; flowers conspicuous, deep red or scarlet, in a terminal bracted raceme, stamens exceeding the corolla, calyx-lobes one-half inch long, linear. Damp woods, marshy places; August–September; frequent; Muscatine, Louisa, Des Moines, Johnson, Story, and Appancose counties; reported from Fayette and Scott counties.

*** Flowers blue, or blue and white.*

† Flowers rather large, the corolla tube about a half-inch in length.

L. syphilitica L. *Great Lobelia.* Perennial; stem 1–3 feet high, angular, hairy to glabrous; leaves lanceolate, acute, thin, unequally serrate; flowers blue, varying to white, in a spike-like raceme; calyx hirsute, sinuses with deflexed auricles; corolla about an inch in length. Moist soil; July–September; common.

L. puberula Mx. Finely soft pubescent; leaves thickish, obtuse, denticulate, oval to oblong or obovate, the lower petioled; sinuses of the calyx with small or inconspicuous auricles; corolla about one-half inch in length. Moist soil; August–September; reported from Scott county.

† † Flowers small; corolla-tube very short.

L. spicata Lam. Stem simple, erect, 1–3 feet high, pubescent below, less so above; leaves oblong, varying from spatulate below to linear bracts above, obtuse, more or less denticulate; flowers in a slender spike-like raceme; calyx-tube short, hemispherical, teeth long and slender; corolla pale blue, tube one-fourth inch or less in length. Upland fields and meadows; June–July; common. The variety HIRTELLA Gray, pubescence somewhat scabrous, bracts and calyx-lobes ciliate or hirsute, occurs along with the type.

L. leptostachya A. DC. Similar to the preceding; sinuses of the calyx with deflexed subulate auricles. Dry soil; June–August; probably belongs to our flora.

L. inflata L. *Indian Tobacco.* A narcotic annual; stem about 1 foot high, simple, erect, branched, hairy or pubescent; leaves ovate, obtusely serrate; flowers small, pedicels shorter than the leafy bracts; pod inflated. Upland woods; July–September; infrequent; Winneshiek, Muscatine, Johnson, Des Moines, Van Buren, Wapello, Appanoose, Louisa, and Decatur counties; reported from Fayette and Story counties.

PYROLACEAE *Agardh.* WINTERGREEN FAMILY.

Low mostly evergreen perennials, with branched rootstocks, simple petioled exstipulate leaves, and perfect, nearly regular, solitary, racemose, or corymbose flowers. Calyx 4–5-lobed. Corolla of 5 petals or 4–

5-parted, white or pink. Stamens as many or twice as many as the lobes of the corolla, hypogynous; anthers 2-celled, opening by terminal pores, frequently appendaged; pollen composed of four united grains. Ovary superior, 4–5-celled; style often declined; stigma 5-lobed or 5-crenate. Capsule many-seeded.

PYROLA. Leaves basal; flowers racemose.
CHIMAPHILA. Stem decumbent; branches erect, leafy; flowers corymbose.

PYROLA L. Calyx 5-parted, free from the ovary. Petals 5, equal, deciduous. Stamens 10; anthers large, more or less 4-celled, inverted, hanging apparently by the apex, opening above by two pores. Style thick; stigma 5-lobed. Capsule 5-celled, many-seeded.

P. elliptica Nutt. *Shin-leaf.* Stemless; leaves elliptical to oval, thin, obscurely wavy-crenate, petioles margined; flowers white, many, nodding; calyx minute, lobes ovate; petals oblong, obtuse, much longer than the calyx; style declined and curved. Rich woods; June–August; frequent locally; Winneshiek, Allamakee, Muscatine, and Johnson counties; reported from Fayette county.

P. secunda L. Stem 3–8 inches high; leaves below, petioled, broadly ovate, sub-serrate; flowers in a spicate raceme, turned to one side; calyx-lobes ovate; corolla oblong, whitish; style exserted. Woods; June–July; local; Winneshiek county.

CHIMAPHILA Pursh. Low perennial herbs, with decumbent stems, ascending branches, opposite or verticillate leaves, and white or purplish flowers. Calyx 5 cleft or 5-parted. Petals 5, orbicular, concave, spreading. Stamens 10; filaments pubescent or hairy; anthers as in Pyrola, 2-horned. Ovary 5-lobed, 5-celled; stigma orbicular, 5-crenate. Capsule 5-lobed, 5-celled, 5-valved; seeds numerous, small.

C. umbellata (L.) Nutt. Branches 4–12 inches high, leafy; leaves spatulate or cuneate-oblanceolate, obtuse or acutish, sharply serrate, evergreen, not mottled; flowers subcorymbose or umbellate. Woods; June–August; reported from Winneshiek and Fayette counties.

MONOTROPACEAE *Lindl.* INDIAN-PIPE FAMILY.

Fleshy saprophytic herbs, with bracted scapes, and solitary or clustered regular perfect flowers. Sepals 2–5, bract-like, deciduous. Petals 4–5, edges connivent. Stamens 8–10; anthers kidney-shaped, 2-celled, becoming 1-celled, opening across the apex. Stigma flattened, about 5-rayed. Capsule grooved, 4–5-celled. Represented in our flora by the genus MONOTROPA L.

M. uniflora L. *Indian Pipe. Corpse-plant.* Scape 4–10 inches high, clustered; roots matted, brittle; leaves represented by scale-like bracts, ovate-lanceolate, sessile; flower terminal, solitary, nodding; capsule erect. Whole plant waxy-white, sometimes pink or red, glabrous, turning black in drying. Rich woods; June-August; infrequent; Jones and Johnson counties; reported from Fayette, Floyd, Muscatine, Story, and Woodbury counties.

VACCINIACEAE *Lindl.* HUCKLEBERRY FAMILY.

Ours small shrubs, with scaly buds, alternate simple leaves, and small perfect flowers in clusters or solitary. Calyx-tube adherent to the ovary, the limb 4–5-lobed or 4–5-cleft. Corolla 4–5-lobed. Stamens 8 or 10;

filaments short, usually flattened; anthers 2-celled. Ovary 2-10-celled, becoming a berry or drupe-like fruit.

GAYLUSSACIA. Stamens 10; ovary 10-celled; berry drupaceous, with 10 nutlets.
VACCINIUM. Stamens 8-10; ovary 4-5-celled; the berry 4-5-celled, the cells many-seeded.

GAYLUSSACIA H. B. K. Calyx adherent to the 10-celled, 10-ovuled ovary, the limb persistent, 5-toothed. Corolla tubular or campanulate, 5-toothed. Stamens 10, opening at the apex. Fruit a globular berry-like drupe.

G. resinosa (Ait.) T. & G. *Black Huckleberry.* A much branched shrub, 1–3 feet high; leaves alternate, oval to oblong, clothed with resinous globules, flowers in clustered racemes, turned to one side; fruit edible, ripe in August; Dry hills; May–June; common in a limited area in Wild Cat Den, Muscatine county.

VACCINIUM L. Calyx-limb 4–5-toothed, persistent. Corolla 4–5-toothed or 4–5-lobed. Stamens 8 or 10. Ovary 4–5-celled; ovules usually many.

V. vacillans Kalm. *Blue Huckleberry.* Shrub, usually 1–2 feet high, much branched; branches glabrous, warty; leaves oblong, oval or obovate, acute or obtuse, mucronulate, glabrous, entire or sparingly serrate, base narrowed or rounded, short-petioled or sessile. Dry soil; May–June; fruit ripe in July–August; reported from Iowa.

PRIMULACEAE *Vent.* PRIMROSE FAMILY.

Herbs, with radical or cauline opposite, alternate or verticillate leaves, and regular, usually 5-parted flowers. Stamens as many as the lobes of the corolla, and inserted on the corolla-tube opposite the lobes. Ovary free, rarely adnate to the calyx, 1-celled, with one central free placenta rising from the base.

* *Acaulescent plants.*

DODECATHEON. Corolla reflexed; stamens exserted.
ANDROSACE. Limb of corolla spreading; stamens included.

* * *Caulescent plants.*

STEIRONEMA. Flowers axillary; stamens 5, alternate with 5 sterile ones or staminodia.
LYSIMACHIA. Flowers axillary, racemose or capitate; staminodia present or wanting.
ANAGALLIS. Flowers racemose; corolla longer than the calyx; capsule circumscissile.

DODECATHEON. L. Perennial; leaves radical, oblong or spatulate. Flowers in an involucrate umbel. Calyx short, 5-parted, reflexed; corolla-lobes much longer, reflexed, tube short. Stamens united at the base, erect; anthers long, conically arranged.

D. meadia L. *Shooting Star.* Scape 1–2 feet high, glabrous as well as the leaves; flowers usually rose-color varying to white. Upland woods; May; frequent; Winneshiek, Delaware, Scott, Muscatine, and Johnson counties; reported from Fayette county.

ANDROSACE L. Small stemless tufted annuals, with umbellate flowers; calyx 5-cleft, with a short tube; corolla white, shorter than the calyx, funnel-form, 5-parted, constricted in the throat. Stamens and style included; capsule 5-valved, globular.

A. occidentalis Pursh. Stem 1–3 inches high; leaves spatulate to oblong, entire; plants minutely canescent. Gravelly banks; April–May; Johnson and Linn counties, reported from Scott county.

STEIRONEMA Raf. Perennials. Leaves opposite or whorled, entire, numerous. Flowers yellow, peduncled, axillary; calyx 5-parted; corolla rotate, deeply 5-parted, tube obsolete, sinuses rounded; petals short-pointed. Stamens 5, scarcely united at the base, alternate with 5 sterile ones or stami-

nodia, inserted at the base of the corolla; anthers linear; capsule 5–10-valved, 10–20-seeded.

S. ciliatum (L.) Raf. Stem erect, 4-angled, simple; leaves long-petioled, lanceolate-ovate, tapering to a sharp point, base cordate, petiole and frequently the margins of the leaf ciliate; corolla longer than the calyx. Thickets; June–August; common.

S. lanceolatum (Walt.) Gray. Erect; 10–24 inches high, leaves lanceolate to linear, on short margined petioles or nearly sessile, very variable. Wet grounds; June–August; frequent; Allamakee, Fayette, Delaware, Louisa, Johnson, Linn, Decatur, Ringgold, Story, Calhoun, and Kossuth counties; reported from Lyon and Emmet counties.

S. longifolium Gray. Stem erect, slender, 4-angled; leaves sessile, opposite or whorled, very narrow, linear, margins revolute, the lower oblong or spatulate; river bottoms; June–July; Winneshiek, Fayette, Story, Cerro-Gordo, and Dallas counties; reported from Scott county. (*S. quadriflorum* (Sims) Hitchcock).

LYSIMACHIA L. Similar to the preceding genus. Leaves glandular-dotted, sessile. Staminodia present or wanting. Filaments united at the base; anthers oval or oblong.

L. thyrsiflora L. Stem 1–2 feet high, simple; leaves narrowly lanceolate, the lower scale-like; inflorescence in thyrsoid pedunculate axillary clusters, shorter than the leaves, from the middle axils; petals linear, dotted, 5–7, with as many intervening teeth; stamens exserted. Swamps; May–July; infrequent; Emmet, Fayette, and Linn counties; reported from Muscatine and Story counties. (*Naumburgia thyrsiflora* (L.) Duby).

L. stricta Ait. Stem 1–2 feet high, 4-angled, at length branched; leaves usually opposite, lanceolate, tapering both ways; flowers in a terminal raceme, yellow; corolla with purple streaks and unarmed sinuses; axils often bulblet bearing. Swamps; June–August; rare; Linn county, reported from Fayette county. (*L. terrestris* (L.) B. S. P.)

ANAGALLIS L. Ours a diffuse annual, with opposite sessile entire leaves, and axillary peduncled flowers. Calyx 5-parted, the lobes subulate, spreading. Corolla rotate, 5-parted. Stamens 5, inserted on the base of the corolla; filaments hairy.

A. arvensis L. Stem 4–12 inches long, glabrous, branched; leaves black-dotted beneath, membranous; peduncles longer than the leaves, at length recurved; corolla scarlet with a purple center, the segments crenate and glandular-ciliate. Waste places; May–August; reported from Lee county.

EBENACEAE *Vent.* EBONY FAMILY.

Trees or shrubs, destitute of milky juice, with alternate entire exstipulate leaves, and diœcious polygamous or rarely perfect flowers. Calyx persistent, 3–6-lobed, free from the ovary. Corolla 3–6-cleft, deciduous. Stamens two or three times the number of the lobes of the corolla, usually some imperfect ones in the pistillate flowers. Ovary several-celled, with 1–3 pendulous ovules in each cell. Fruit a berry. Represented by the genus DIOSPYROS L.

D. virginiana L. *Persimmon* A small tree, ordinarily 10–30 feet high; wood hard, tough, blackish; leaves ovate or oval, acuminate, at first pubescent, becoming glabrous, petioled; flowers mostly 4-parted, cymose, racemose or solitary; corolla pale greenish yellow; stamens about 16 in the sterile

flowers and 8 or fewer in the pistillate flowers: fruit globose, about one inch in diameter, reddish yellow, ripe after frost, edible; seeds 6–8, large, dark purple. Woods; May–June; reported from southeastern Iowa.

OLEACEAE *Lindl.* Olive Family.

Trees or shrubs. Leaves opposite, simple or compound. Calyx and corolla usually 4-cleft, sometimes wanting. Stamens 2. Ovary free, 2-celled, with 2 ovules in each cell.

Fraxinus. Leaves pinnate: flowers diœcious: fruit a samara.
Syringa. Leaves simple: flowers complete: fruit a capsule.

FRAXINUS L. Ash. Flowers diœcious, racemose or panicled, axillary, from second year's growth. Calyx diminutive or wanting, entire or 4-cleft. Corolla of 2–4 petals or wanting. Anthers linear or oblong. Style 1, stigma 2-cleft. Fruit a samara.

* *Lateral leaflets stalked; calyx small, persistent.*

† *Body of the samara terete or nearly so, the wing mostly terminal.*

F. americana L. *White Ash.* A large tree; leaflets 5–9, ovate or lanceolate, acuminate, obscurely serrate, smooth or pubescent on the veins beneath, petioles, petiolules and branchlets glabrous; body of the fruit terete, half as long as the wing, marginless below, wing rising abruptly above, varying in outline from lanceolate to linear. Along streams; April–May; frequent.

F. viridis Mx. *Green Ash.* A smaller tree, leaflets 5–9, ovate or lance-ovate, taper-pointed, serrate, bright green below, petioles, petiolules, and branchlets glabrous; body of the fruit slender, as long as the wing, tapering; wing decurrent, spatulate. Woods; April–May; frequent. (*F. lanceolata* Borck.)

F. pubescens Lam. *Red Ash.* Branches, petioles, petiolules, rachis, and lower surfaces of the leaves velvety-pubescent; leaflets 5–9, ovate, ovate-lanceolate or oblong, acuminate, entire or denticulate; body of the fruit linear, wing linear or spatulate, decurrent. Creek bottoms; April–May; reported from Muscatine county. (*F. pennsylvanica* Marsh.)

† † *Body of the samara flat, winged all around.*

F. quadrangulata Mx. *Blue Ash.* Branchlets 4-angular; leaflets 7–11, glabrous, ovate, lanceolate, or oblong, acuminate, base narrowed or rounded, serrate or serrulate; samara narrowly oblong or cuneate, wing usually notched above, decurrent around the body. Reported from Fayette county.

* * *Lateral leaflets sessile; calyx wanting; samara winged all around.*

F. sambucifolia Lam. *Black Ash.* Leaflets 7–11, sessile, oblong-lanceolate, tapering, serrate; fruit oblong or linear-oblong, ends equal. Along streams; April–May; infrequent; reported from Muscatine and Story counties. (*F. nigra* Marsh.)

SYRINGA L. A shrub, with opposite entire deciduous leaves, and complete flowers in terminal panicles or thyrses. Calyx 4-toothed, persistent. Corolla 4-lobed. Stamens 2. Ovary 2-celled, with 2 pendulous ovules in each cell; style elongated; stigma 2-cleft. Capsule oblong, 2-valved.

S. vulgaris L. *Lilac.* Run wild along the railway in Dubuque county.

APOCYNACEAE *Lindl.* Dogbane Family.

Perennial herbs, with milky juice, opposite leaves, and regular 5-parted flowers. Calyx persistent. Lobes of the corolla twisted in the bud. Stamens 5, inserted on the corolla; filaments distinct, pollen granular. Ovaries 2, superior; stigmas united. Fruit a follicle.

APOCYNUM L. Bark fibrous. Leaves mucronate-pointed. Calyx 5-parted. Corolla campanulate, 5-cleft. Stamens included, attached to the base of the corolla; anthers sagittate, longer than the filaments. Follicles separate, slender; seeds with a tuft of silky hairs at the apex.

A. androsaemifolium L. *Dogbane.* Stem 2–3 feet high, mostly glabrous branches divergent; leaves ovate, downy beneath, short-petioled; flowers in spreading cymes, terminal or lateral; corolla rose red, tube longer than the calyx. Fields and waste places; June–July; frequent throughout the state.

A. cannabinum L. *Indian Hemp.* Stem 2–4 feet high, glabrous to soft-pubescent; branches ascending; leaves sessile, oval to oblong, base somewhat cordate; cymes terminal; corolla greenish white, tube about the length of the calyx-lobes. Rich soil; July–August; frequent.

A. pubescens R. Br. Whole plant densely velvety-pubescent; leaves oval to elliptic, obtuse or acute, mucronate; cymes dense. Reported from Blackhawk county by Arthur. According to Britton and Brown this species was collected by Dr. C. C. Parry in Polk county in the year 1867.

ASCLEPIADACEAE *Lindl.* MILKWEED FAMILY.

Herbs, usually with milky juice, and opposite, whorled or scattered, entire exstipulate leaves. Flowers in some form of an umbel, regular, parts in 5's, sepals and petals valvate in the bud. Stamens 5, adhering to and covering the 2 stigmas.

ASCLEPIAS. Hoods provided with horns.
ACERATES. Hoods destitute of horns.

ASCLEPIAS L. MILKWEED. Perennials. Calyx persistent, 5-parted, reflexed. Corolla 5-parted, deciduous, valvate in the bud, reflexed. Crown made up of 5-hooded bodies, each with an incurved horn. Stamens inserted on the base of the corolla; anthers consolidated with the stigma, tipped with a membranaceous appendage, 2-celled, each containing a suspended waxy pollen mass, the pollinia, those of each anther forming pairs. Ovaries 2, developing into 1 or 2 follicles. Seeds flat, with a tuft of silky hairs at one end.

* *Leaves opposite or alternate; corolla and corona orange.*

A. tuberosa L. *Butterfly-weed.* Root tuberous; stem 1–2 feet high; juice not milky; roughish-hairy, leafy, branching near the top; leaves alternate, sessile or short-petioled, linear or lance-oblong; umbels many, erect, corymbed; flowers scarlet. Fields; June–July; common.

A. decumbens L. Stems decumbent, 2–3 feet long, hirsute-pubescent; leaves oblong or elliptic, obtuse, short-petioled or sessile, mostly opposite; umbels from the upper axils; corolla dark orange; follicles slender, erect. Fields; June–August; infrequent; reported from Story county. (*A. tuberosa* var. *decumbens* Pursh.)

** *Leaves opposite; corolla bright red or purple.*

A. purpurascens L. *Purple M.* Stem 2–3 feet high, simple, smooth; leaves opposite, short-petioled, ovate or elliptical, short-pointed, short-pubescent beneath; umbels solitary, long-peduncled, axillary, pedicels shorter; flowers long, dark purple. Prairies and thickets; June–August; infrequent; Johnson, Henry, Appanoose, Decatur, Ringgold, Union, and Emmet counties; reported from Scott, Muscatine and Story counties.

A. incarnata L. *Swamp M.* Stem 2–5 feet high, mostly smooth; leaves

lanceolate, pointed, short-petioled, base obscurely heart-shaped; flowers small, rose purple. Wet places: July–September; common.

* * * *Leaves opposite or verticillate; corolla white, greenish, yellowish or purplish.*

† *Leaves varying from ovate or oblong to obovate or orbicular.*

‡ *Leaves short-petioled or sessile, clasping; plants mostly glabrous.*

A. sullivantii Englm. Tall, smooth; leaves ovate-oblong or oblong, base somewhat heart-shaped, nearly sessile, smooth on both sides; hoods obovate; follicles spiny on or toward the beak. Moist soil: July–August; frequent; Emmet, Muscatine, Jefferson, Appanoose, Decatur, Taylor, Page, Calhoun, Hancock, Cerro Gordo, and Shelby counties; reported from Fayette and Story counties.

A. obtusifolia Mx. Stem 2–3 feet high, smooth; leaves opposite, sessile, transversely veined, waxy, oblong to oblong-ovate, mucronate, sessile, subcordate; umbel on a long naked peduncle; flowers reddish green. Fields; May–September; infrequent; Johnson, Linn, Union, Adams, Montgomery, and Shelby counties.

A. meadii Torr. Stem simple, 1–2 feet high, smooth; leaves sessile, ovate or oblong-ovate, pointed or obtuse; peduncle about twice the length of the leaves; pedicels about an inch long; flowers greenish white. Dry soil: May–June; rare; Decatur and Adams counties.

‡ ‡ *Leaves petioled; plants glabrous*

A. phytolaccoides Pursh. *Poke M.* Stem 3–5 feet high, simple, smooth; leaves broadly ovate, tapering both ways, petioled, opposite, mostly smooth beneath; umbels several, axillary; peduncles 2–3 inches long; pedicels almost as long, very slender, drooping; flowers 10–20 in an umbel, greenish; hoods truncate, white, horns exserted. Woods, thickets; June–July; infrequent Winneshiek and Johnson counties; reported from Fayette, Scott, and Muscatine counties. (*A. exaltata* (L.) Muhl.)

A. quadrifolia Jacq. Stem 1–2 feet high, slender, simple; leaves ovate to lanceolate, thin, somewhat pubescent on the veins beneath, acute or acuminate, petioled, the upper and lower opposite, the middle verticillate in 4's; corolla pink or whitish; hoods white; follicles erect, glabrous. Woods; May–July; infrequent; Muscatine, Johnson, Henry, and Lee counties.

‡ ‡ ‡ *The lower surfaces of the leaves and often the whole plant canescent or tomentose.*

% *Follicles with soft spinose processes, tomentose.*

A. cornuti Decaisne. *Common M.* Stem 2–4 feet high, short-pubescent; leaves short-petioled, oval or oblong, large, downy beneath, longer than the umbels; flowers varying from dull purple to white; follicles spiny, tomentose. Fields and waste places; June–July; common. (*A. syriaca* L.)

A. speciosa Torr. Whole plant white-tomentose or canescent or glabrate below; stem 1–3 feet high, simple; leaves broadly ovate or oval, obtuse and cuspidate or acute at the apex, base subcordate, rounded or narrowed, petioled; corolla purple-green; hoods elongated, lanceolate, with 2 blunt teeth below; horns short, inflexed; follicles erect or spreading, densely woolly, covered with soft spinose processes. Moist soil; May–July; infrequent; Emmet and Hancock counties.

% % *Follicles with no spinose processes, glabrous or pubescent.*

A. ovalifolia Decaisne. Stem 1–2 feet high, downy; leaves ovate, acutish, short-petioled; peduncle very short, pedicels longer; hoods yellow, horns included; corolla-lobes greenish white tinged with purple. Prairies; June–

July; rare; Emmet county; reported from Fayette, Story, and Woodbury counties.

† † *Leaves varying from narrowly lanceolate to linear.*

A. verticillata L. Stems simple, 2–3 feet high; leaves 3–6 in a whorl, sometimes scattered, sessile, very narrow, linear, margins revolute; umbels small, lateral or terminal; corolla greenish white; horns exserted; follicles slender, erect, glabrous. Dry wooded hills; July–August; common.

ACERATES Ell. GREEN MILKWEEDS. Perennials. Hoods without horns. Flowers greenish, in close umbels.

A. longifolia Ell. Stem 2–3 feet high, roughish-pubescent, leafy; leaves 3–7 inches long, linear, sessile, scattered; umbels lateral, peduncle and pedicels about equal in length. Fields and prairies; July–September; frequent. (*A. floridana* (Lam.) Hitchcock).

A. viridiflora (Raf.) Eaton. Stem 1–2 feet high, whitish-pubescent; leaves opposite, oval, oblong or ovate, short-petioled or sessile; umbels lateral, short-peduncled or sessile. Prairies; June–September; frequent. Variable; one of its forms, the variety LANCEOLATA Gray, has lanceolate leaves and is found with the typical form.

A. lanuginosa Decaisne. Low, hairy; umbel solitary, terminal. Reported from Plymouth county.

GENTIANACEAE *Dumort.* GENTIAN FAMILY.

Herbs, with a watery bitter juice, opposite, rarely alternate, simple, sessile entire exstipulate leaves, and regular, solitary or cymose flowers. Stamens as many as the lobes of the corolla, and alternate with them. Ovary superior, 1-celled, with 2 parietal placentae. Fruit a 2-valved many-seeded capsule.

GENTIANA L. GENTIAN. Leaves simple, sessile, opposite. Calyx 4–5-cleft, persistent. Corolla 4–5-cleft, funnel-form or campanulate, sinuses usually appendaged. Stamens inserted on the corolla. Stigmas 2, sessile or nearly so.

* *Corolla with no plaits or teeth in the sinuses.*

G. crinita Froel. *Fringed G.* Annual, 1–2 feet high; stem and branches erect, smooth; leaves lanceolate, acute, base somewhat cordate; flowers blue, large, on long terminal peduncles, mostly in 4's; corolla-tube as long as the ovate acute calyx-lobes; corolla-lobes obovate, fringed. Wet places; September–October; infrequent; Muscatine, Johnson, Linn, and Chickasaw counties; reported from Fayette, Story, and Hamilton counties.

G. quinquefolia L. Annual; stem 1–2 feet high, 4-angled, branched; leaves ovate-lanceolate, partly clasping; flowers smaller than those of the preceding species, peduncled, usually 5 in a cluster, pale blue, corolla-lobes bristle pointed. The type has the calyx-lobes very small, lance-linear. The common form with us is the variety OCCIDENTALIS Gray, which has the calyx-lobes leaf-like, half as long as the corolla. Moist soil, woods; August–October; Winneshiek, Johnson, Jefferson, Henry, and Hancock counties; reported from Fayette, Muscatine, Story, and Emmet counties.

* * *Corolla with toothed or lobed plaits in the sinuses.*

G. puberula Mx. Stem about one foot high, roughish, leafy; leaves linear-lanceolate, thick; flowers clustered; calyx-lobes narrowly lanceolate; corolla blue, 2 or 3 times the length of the calyx, the lobes ovate, spreading; sinuses of the corolla with cut-toothed appendages. Prairies; August–September;

frequent: Winneshiek, Floyd, Muscatine, Johnson, Jefferson, Decatur, Winnebago, and Emmet counties: reported from Fayette, Story, Plymouth, and Woodbury counties.

G. andrewsii Griseb. *Closed G.* Stem simple, smooth; leaves ovate-lanceolate to lanceolate, tapering to the apex and frequently more or less toward the base; calyx-lobes ovate to lanceolate, shorter than the tube; corolla one and one-half inches long, inflated, bluish, folds in the sinuses fringed and as long as the segments. Moist woods; August–October; frequent; Delaware, Muscatine, Johnson, Linn, Appanoose, Decatur, Story, Winnebago, and Emmet counties; reported from Fayette and Woodbury counties.

G. flavida Gray. Stem simple, 1–2 feet high; leaves ovate-lanceolate, tapering, base somewhat cordate, partly clasping; flowers in a terminal involucrate cluster, sessile; calyx-lobes ovate, short; corolla white, somewhat inflated, lobes longer than the toothed appendages. Moist soil, woods; August–October; infrequent; Winneshiek, Fayette, Delaware, Muscatine, Johnson, Jefferson, Decatur, and Taylor counties; reported from Scott and Story counties. (*G. alba* of Gray's Manual).

MENYANTHACEAE *G. Don.* Buckbean Family.

Ours a perennial marsh herb, with a thickish creeping rootstock, basal or alternate 3-foliolate leaves, and regular perfect flowers. Calyx 5-parted, persistent, inferior. Corolla 5-lobed or 5-cleft. Stamens 5, borne on the corolla, and alternate with its lobes; filaments short; pollen-grains 3-angled. Ovary 1-celled, with 2 placentae. Fruit a capsule. Represented in our flora by the genus Menyanthes L.

M. trifoliata L. *Buckbean.* Rootstock 1 foot long or less, thick, scaly; leaves long-petioled; leaflets oblong or obovate, entire, obtuse, base narrowed and sessile; raceme borne on a long naked peduncle, from the rootstock; corolla white or purplish, white-bearded inside; stamens usually included and the style exserted. Marshes; May–July; infrequent; Emmet and Cerro Gordo counties.

POLEMONIACEAE *DC.* Phlox Family.

Herbs, with alternate or opposite entire leaves, and regular showy perfect flowers. Calyx and corolla 5-parted. Stamens 5, inserted on the long tube of the corolla, alternate with the lobes. Ovary 3-celled; stigmas 3, linear. Fruit a 3-celled, 3-valved loculicidal capsule.

Phlox. Leaves opposite, entire.
Polemonium. Leaves alternate, pinnate or pinnately parted.
Collomia. Leaves alternate, entire.

PHLOX L. Leaves opposite, sessile, entire. Calyx narrow, deeply 5-cleft. Corolla salver-formed, tube long, limb spreading. Stamens 5, unequally inserted, included. Cells of the capsule 1-seeded. Flowers cymose, bracted, terminal or in the upper axils. Perennials.

P. paniculata L. Stem 3–4 feet high, smooth; leaves ovate-lanceolate, tapering both ways; panicle large, many-flowered; calyx-teeth awn-pointed; corolla pink-purple varying to white. Cultivated, occasionally escaped; June–August; Johnson county; reported from Fayette county.

P. maculata L. Stem 2–3 feet high, slender, smooth, purple spotted; leaves lanceolate, the tapering base cordate; flowers in a narrow panicle;

calyx-teeth triangular, much shorter than the tube; corolla purple. Fields; June–August; Jones, Johnson, Linn, Cerro Gordo, and Hancock counties; reported from Fayette and Story counties.

P. pilosa L. Stem 12–18 inches high, hairy or pubescent; leaves lanceolate to linear, gradually tapering to an acute apex; calyx-teeth bristle-pointed about half the length of the corolla-tube; corolla pink or pinkish, lobes obovate, entire. Prairie soil; May; common.

P. divaricata L. Stem 6–18 inches high, from a more or less decumbent base, pubescent; leaves ovate to oblong-lanceolate; cymes corymbose-paniculate, loosely spreading; calyx-teeth slender, half the length of the corolla-tube; corolla pale blue or lilac, varying to white, lobes obovate, notched or rounded. Moist woods; April–May; common.

P. bifida Beck. Low; stem 5–6 inches high, pubescent; leaves linear to narrowly lanceolate; flowers few, on slender peduncles; calyx-teeth about as long as the tube; corolla purple, lobes cleft to the middle, divisions linear-oblong. May; sandy soil along Cedar river, Muscatine county; reported from Benton county.

P. subulata L. *Ground or Moss Pink.* Pubescent or at length glabrate, evergreen; stems tufted, much-branched, diffuse, forming mats; leaves varying from narrowly oblong to linear-subulate, acute or acuminate, rigid, ciliate, usually fascicled; flowers cymose, pink, purple, or white; corolla-lobes cuneate-obcordate, rarely entire. Sandy or dry soil; April–May; an escape from gardens and cemeteries; Page county; reported from Fayette county.

POLEMONIUM L. Perennials, with alternate pinnate leaves, and cymose-paniculate flowers. Calyx campanulate, leaf-like, 5-cleft. Stamens 5, equally inserted near the base of the corolla, declined, base of the filaments hairy.

P. reptans L. Stem 6–14 inches high, weak, branched, spreading; smooth to minutely pubescent; leaflets 7–15, varying from ovate-lanceolate to oblong; flowers corymbose, nodding; calyx somewhat inflated in fruit; corolla light blue; stamens and style included. Rich woods; May–June; frequent; Winneshiek; Allamakee, Scott, Muscatine, Johnson, Henry, Decatur, Mahaska and Cerro Gordo counties; reported from Fayette, Story, and Cherokee counties.

COLLOMIA Nutt. Annual. Leaves alternate, entire. Flowers glomerate, mostly terminal, with leaf-like bracts. Stamens unequally inserted on the slender funnelform corolla.

C. linearis Nutt. Stem 6–12 inches high, minutely pubescent; at length much-branched; leaves linear or oblong-lanceolate; corolla slender, varying from purplish to white, limb small. Dry soil; May–August; infrequent; Decatur and Lyon counties. (*Gilia linearis* Gray).

HYDROPHYLLACEAE *Lindl.* WATER-LEAF FAMILY.

Herbs, with alternate or basal, lobed or pinnate leaves, and perfect regular blue or white, solitary, cymose or racemose flowers. Calyx 5-cleft, persistent, free, often appendaged. Corolla 5-lobed. Stamens 5, inserted on the corolla-tube. Style deeply 2-cleft. Ovary entire, 1-celled, rarely 2-celled, with 2-parietal placentae.

HYDROPHYLLUM. Stamens exserted; calyx not enlarged in fruit.
ELLISIA. Stamens included; calyx enlarged in fruit.

HYDROPHYLLUM L. WATER-LEAF. Perennials. Leaves cut-toothed, mostly pinnate. Flower clusters coiled when young. Calyx 5-parted. Corolla campanulate, 5-cleft, nectariferous down the inside of the tube. Stamens

usually exserted. anthers linear. Ovary 1-celled, hairy. Capsule 1–4-seeded.

* *Calyx not at all or scarcely appendaged in the sinuses.*

H. virginicum L. Stem 12–20 inches high, sparingly pubescent, becoming glabrate: leaves pinnatifid, leaflets ovate or oblong, pointed, cut-toothed, often incised. the upper confluent; peduncles longer than the petioles, forked: flowers pale blue, in a roundish cluster: calyx not appendaged, its lobes linear, ciliate: stamens and style exserted. Rich woods; May–June: common.

H. macrophyllum Nutt. Stem hairy; leaves ovate-oblong, pinnatifid, cut-toothed: peduncles shorter than the petioles; flowers white, in dense globose cymes; calyx-lobes lanceolate, filaments exserted. Rich woods: June–July; rare; Johnson county: reported from Scott county.

** *Calyx with short reflexed appendages in the sinuses.*

H. appendiculatum Mx. Stem 1–2 feet high, hairy, weak; leaves broadly ovate, base rounded, long-petioled, palmately 5-lobed, lowest pinnately divided; lobes pointed, widely toothed; calyx with short appendages, its lobes triangular-lanceolate; stamens slightly if at all exserted; flowers blue. Rich woods, near the base of cliffs; May–June; common in the eastern counties, rarer westward: Winneshiek, Jackson, Muscatine, Des Moines, Lee, Henry, Johnson, and Boone counties; reported from Fayette county.

ELLISIA L. Delicate annual, at length much-branched. Leaves pinnately parted, divisions linear-oblong or lanceolate, incised or toothed. Flowers solitary, whitish. Calyx 5-parted, becoming large and foliaceous in fruit, not appendaged. Corolla narrowly campanulate, about the length of the calyx, tube with 5 small appendages within. Stamens included.

E. nyctelea L. Stem weak, somewhat hairy; leaves petioled, lower opposite, upper alternate: peduncles slender, axillary or opposite the leaves. Rich soil; May–July: fields and woods; common. (*Macrocalyx nyctelea* (L.) Kuntze).

BORRAGINACEAE. *Lindl.* Borage Family.

Annual biennial or perennial herbs, with round stems, and alternate entire exstipulate leaves. Calyx 5-parted. Corolla 5-lobed, imbricated in the bud, convolute in Myosotis. Stamens 5, inserted on the tube of the corolla. Style 1; stigmas 1 or 2. Ovary deeply 4-lobed, in ours separating into 4 one-seeded nutlets, style rising from their midst. Flowers in slender bracted or bractless racemes.

* *Nutlets armed with prickles.*

Cynoglossum. Corolla funnelform: nutlets attached near the apex, much produced backwards.

Echinospermum. Corolla salverform: nutlets erect or ascending.

** *Nutlets unarmed.*

Mertensia. Corolla trumpet-shaped, purplish blue.

Myosotis. Corolla tubular or salverform, lobes rounded, throat closed.

Lithospermum. Corolla funnelform or salverform, yellow, limb spreading, throat naked or appendaged.

Onosmodium. Corolla tubular, hirsute, whitish, erect, unappendaged.

Echium. Flowers irregular: stamens exserted.

CYNOGLOSSUM L. Coarse strong-scented herbs, with alternate entire leaves, and blue or white flowers. Calyx 5-parted. Corolla funnelform, about equalling the calyx, throat closed by convex scales, lobes rounded. Nutlets depressed, attached near the apex to the base of the style, the 4-nut-

lets giving a broad pyramidal outline, outer surface covered with short hooked prickles.

C. officinale L. *Hound's Tongue.* Biennial; stem 1-2 feet high, silky-pubescent; lower leaves petioled, upper sessile, oblong-lanceolate; flowers in slender panicled racemes, bracted only at the base; corolla reddish-purple; nutlets rather flattened on the broad upper surface. Pastures and waste places; June–July; infrequent; Allamakee, Scott, Muscatine, Des Moines, Henry, Lee, and Fremont counties; reported from Fayette county.

ECHINOSPERMUM Lehm. Annual biennial or perennial herbs, more or less hirsute or canescent, with bracted racemes, and small blue or white flowers. Calyx 5-parted. Corolla short, salverform, lobes obtuse, imbricated in the bud, throat closed by 5 short concave scales. Stamens included. Nutlets erect, smooth on their inner faces, armed on the back with 1–3 rows of barbed prickles.

* *Racemes bracted; fruiting pedicels erect or spreading.*

E. lappula Lehm. Annual; stem 1–2 feet high, erect, strict, bristly-hairy; leaves linear, lanceolate or the lower spatulate; corolla blue, longer than the calyx; nutlets with two rows of spines on the margin or scattered over the entire surface. Waste places; June–August; frequent. (*Lappula lappula* (L.) Karst).

E. texanum Scheele. Annual; similar to the preceding, 6–20 inches high, branched; leaves linear or linear-oblong, obtuse; nutlets with a single row of spines on the margins, papillose-tuberculate on the back. Dry soil; May–August; infrequent; Winneshiek, Johnson, and Woodbury counties. (*Lappula texana* (Scheele) Britton. *E. redowski occidentalis* Watson, of Gray's Manual).

* * *Racemes bracted at the base; fruiting pedicels deflexed.*

E. virginicum Lehm. *Beggar's Lice.* Biennial; stem 2–4 feet high, much-branched, rough-pubescent; leaves large, oval or ovate-oblong, acuminate, narrowed to the base; racemes slender, widely diverging; flowers small, white; nutlets armed all over the back with double-barbed prickles. Dry soil, waste places; June–September; common. (*Lappula virginiana* (L.) Greene).

E. americanum (Gray). Annual; stem 4–10 inches high, hairy; leaves linear-oblong to lanceolate; flowers small, blue, in a lax raceme; nutlets pyramidal, prickles only on the margins. Dry soil; May–August; infrequent; reported from Iowa.

MYOSOTUS L. Flowers small, in naked racemes, sometimes bracted at the base. Calyx 5-cleft. Corolla tubular or salverform, convolute in the bud, the tube about the length of the calyx, the throat closed by 5 short concave appendages. Stamens included. Nutlets ovate, smooth, compressed.

M. verna Nutt. Annual or biennial; stem 4–7 inches high, bristly-hairy; lower leaves spatulate-oblong, the upper obtuse; linear-oblong; raceme leafy at the base; calyx deeply 5-cleft, somewhat 2-lipped, hispid; corolla small, white, pedicels in fruit rather shorter than the calyx. Dry soil; May–July; infrequent; Muscatine, Johnson, and Linn counties; reported from Benton county. (*M. virginica* (L.) B. S. P.

MERTENSIA Roth. Glabrous or pubescent perennials, with alternate leaves, and blue or purple flowers in cymes, panicles, or racemes. Calyx short, 5-cleft. Corolla-tube cylindrical, limb somewhat campanulate, 5-cleft, throat naked or with 5 small folds alternate with the stamens. Stamens in-

serted at the top of the tube, anthers oblong. Style filiform, long. Nutlets ovoid, smooth or wrinkled.

M. virginica (L.) DC. *Blue-bells. Lungwort. Virginia Cowslip.* Stem about one foot high, usually smooth; leaves thin, pale, entire, oval, oblong or obovate, obtuse, upper sessile, lower petioled, long; flowers in a corymbose raceme; corolla trumpet-shaped, much exceeding the calyx, blue or purplish blue, limb nearly entire, throat naked; filaments slender, exserted. Damp soil along streams; April–May; frequent; Winneshiek, Scott, Muscatine, Johnson, Des Moines, Van Buren, Page, and Polk counties; reported from Fayette and Story counties.

M. paniculata (Ait.) Don. Stem 1–2 feet high, erect, scabrous; leaves thin, ovate to ovate-lanceolate, taper-pointed, the upper sessile, the lower petioled; calyx-lobes lanceolate or linear; corolla usually 2–3 times the length of the calyx, 5-lobed, purple-blue, throat crested, filaments broad and short. Woods; June–August; infrequent; Winneshiek county.

LITHOSPERMUM L. Mostly perennials, with thickish descending roots, usually containing a red dye, sessile or short-petioled leaves, and blue, yellow or white flowers in leafy-bracted spikes or racemes. Calyx 5-parted or 5-cleft, the lobes narrow. Corolla funnelform or salverform, limb 5-lobed, throat open, appendages sometimes present. Anthers 5, included, oblong, nearly sessile. Nutlets 4, smooth, white, shining, or brown and wrinkled.

* *Corolla yellowish or white; its tube shorter than or only equalling the calyx.*

† *Nutlets brown, wrinkled and pitted.*

L. arvense L. Annual or biennial; stem 1–2 feet high, usually branched; leaves linear, linear-oblong or lanceolate; flowers sessile, in spikes; nutlets brown, wrinkled, pitted. Waste places; May–August; reported from Muscatine and Lee counties.

† † *Nutlets smooth, shining, ivory white.*

L. officinale L. *Gromwell.* Perennial; puberulent; stem 2–4 feet high, leafy, branched; leaves lanceolate or oblong-lanceolate, acute; flowers yellowish-white; nutlets white, ovoid. Waste places; May–August; reported from Fayette county.

L. latifolium Mx. Perennial; stem erect, simple or branched, rough-pubescent; leaves ovate-lanceolate, tapering both ways, rough on the upper surface, soft-pubescent beneath; flowers small, pale yellow; corolla shorter than the calyx, throat with 5 appendages. Upland woods; May; infrequent; Winneshiek, Webster, Pottawattamie, and Shelby counties; reported from Fayette and Story counties.

* * *Corolla yellow, its tube longer than the calyx; nutlets white, smooth, shining.*

† *Corolla-tube not more than twice the length of the calyx.*

L. hirtum Lehm. *Hairy Puccoon.* Stem erect, 1–2 feet high, covered with stiff hairs; leaves lanceolate or linear, rough, obtuse; flowers peduncled, yellow; corolla twice the length of the calyx, woolly at the base inside. Sandy soil, woods; April–June; frequent; Winneshiek, Allamakee, Floyd, Johnson, Lyon, and Emmet counties; reported from Fayette, Scott, and Muscatine counties. (*L. gmelini* (Mx.) Hitchcock).

L. canescens (Mx.) Lehm. *Hoary Puccoon.* Erect, simple, 6–15 inches high, soft canescent; leaves obtuse, linear or linear-oblong; flowers orange-yellow, sessile; corolla-tube twice the length of the calyx, naked at the base inside. Fields and prairies; May–June; common; Winneshiek, Allamakee, Scott, Muscatine, Johnson, Henry, Decatur, Page, Pottawattamie, Calhoun.

and Shelby counties; reported from Fayette, Story, and Woodbury counties.

† † *Corolla-tube 2–4 times the length of the calyx.*

L. angustifolium Mx. Stem erect or suberect, 6–14 inches high, hoary; leaves linear; flowers of two kinds, pedicelled, the early ones showy; corolla-tube about one inch in length, cylindrical, the lobes 5, rounded, denticulate; the later flowers small, inconspicuous and with pale corollas. Dry or sandy soil, prairies; widely distributed, common in the western counties, infrequent in the eastern counties; Winneshiek, Fayette, Floyd, Delaware, Linn, Pottawattamie, Shelby, and Emmet counties; reported from Scott, Story, and Woodbury counties.

ONOSMODIUM Mx. Hirsute or hispid perennials, with alternate entire leaves, and greenish or greenish yellow flowers in spike-like one-sided racemes. Calyx 5-parted, segments linear. Corolla cylindrical, 5-lobed; anthers sessile, included, oblong-linear or arrow-shaped, mucronate. Style slender, much exserted. Fruit a bony nutlet, shining, ovoid.

O. molle Mx. Plant pale, soft hirsute; stem 1–2 feet high; leaves sessile, oblong-lanceolate, acutish, prominently veined; corolla about twice the length of the calyx, hirsute externally; nutlets ovoid-globose. Prairies and pastures; May–July; common in the western counties, infrequent eastward; Winneshiek, Allamakee, Webster, Johnson, Union, Adams, Montgomery, Page, Fremont, Pottawattamie, Shelby, Cerro Gordo, Lyon, and Dickinson counties; reported from Fayette, Scott, Muscatine, Story, and Woodbury counties. (*O. carolinianum* var. *molle* Gray.) The hirsuteness varies from short and soft to rather long and somewhat shaggy, and some forms closely resemble the next.

O. carolinianum (Lam.) DC. Similar to the preceding, usually taller, green, shaggy-hirsute; nutlets ovoid. Probably belongs to our flora.

ECHIUM L. A biennial bristly-hairy herb, with alternate sessile oblong linear-oblong or linear-lanceolate leaves, and rather large blue violet flowers in short leafy-bracted one-sided spikes. Calyx 5-parted. Corolla with a funnelform tube, the limb unequally 5-lobed. Stamens 5, inserted on the lower portion of the tube.

E. vulgare L. *Viper's Bugloss. Blueweed.* Reported from Story county.

CONVOLVULACEAE *Vent.* MORNING-GLORY FAMILY.

Trailing or twining herbs, with alternate, petioled, exstipulate leaves, and peduncled axillary flowers. Flowers showy, solitary or cymose; peduncles frequently 2-bracted. Calyx imbricated, of 5 sepals. Corolla monopetalous, 5-plaited or 5-lobed, convolute in the bud. Stamens 5, alternate with the corolla-lobes, inserted on the corolla-tube. Ovary free, 2-celled, or sometimes apparently 4-celled. Capsule globular, 2–6-seeded.

CONVOLVULUS. Style undivided or 2-cleft; stigmas 2, linear or oblong.
IPOMOEA. Style undivided; stigma capitate or 2-3-lobed.
BREWERIA. Style 2-cleft; stigmas capitate.

CONVOLVULUS L. BINDWEED. Corolla funnelform or companulate, including the stamens. Style 1; stigmas 2, narrowly linear to ovate.

C. sepium L. Trailing or climbing extensively, glabrous or somewhat pubescent, leaves slender-petioled, triangular-sagittate, pointed, auricles angulately-lobed or entire; calyx with 2 ovate acute bracts below; corolla large, white or tinged with rose color. Rich soil, fields and thickets; June–August; common.

C. spithamaeus L. Stem simple erect or ascending, tomentose, 4–12 inches high; leaves short-petioled, oblong, with a somewhat sagittate or cordate base. Stigmas oval; bracts ovate. Dry soil; May–August; infrequent; Johnson county.

C. arvensis L. Mostly prostrate; leaves narrowly sagittate or hastate; calyx bractless; corolla small, pink or whitish; peduncles with 2 small bracts near the base; styles slender. Fields and waste places; May–September; infrequent; Muscatine, Johnson, Henry, Decatur, Taylor, and Fremont counties; reported from Fayette and Scott counties.

IPOMOEA L. Morning Glory. Calyx of 5-sepals, outer sepals usually larger, no bracts at the base. Corolla funnelform to campanulate. Stamens included. Style undivided; stigma capitate.

* *Ovary 2-celled, stigma entire or 2-lobed.*

I. pandurata (L.) Meyer. Perennial; stems from a large tuber, trailing or twining, smooth; leaves cordate, acuminate; peduncles longer than the petioles, 1–5-flowered; sepals ovate, obtuse; corolla 2–3 inches long, white, purple inside. Dry soil, thickets and in fields; May–September; Winneshiek, Muscatine, Louisa, Johnson, Henry, Lee, Des Moines, Van Buren, Decatur, and Lyon counties.

I. lacunosa L. Annual, roots fibrous; glabrous, pubescent or hairy; peduncles 1–3-flowered, shorter than the petioles; sepals lanceolate, pointed, margins ciliate; corolla about one-half inch long, white, limb purple, 5-lobed. Moist soil; July–September; infrequent; along the Mississippi river; Muscatine county.

* * *Ovary 3-celled; stigmas 3.*

I. hederacea Jacq. Annual, hairy; leaves cordate, 3-lobed, lobes ovate, acute or acuminate, peduncles long, 1–3-flowered, sepals narrowly lanceolate, lower part hairy; corolla white, bluish or purple. Waste grounds; August–September; Johnson, Henry, and Lee counties; reported from Scott county.

I. purpurea (L.) Roth. Annual, stem, sepals and flowers similar to the preceding but leaves cordate, entire, acuminate. Escaped from cultivation; July–September; Johnson, Henry and Decatur counties; reported from Fayette, Scott, and Story counties.

BREWERIA R. Br. Perennials; for the most part similar to the two preceding genera. Style 2-cleft; stigmas capitate.

B. pickeringii (Curtis) Gray. Pubescent to glabrate; leaves linear-spatulate to narrowly linear, short-petioled or almost sessile; peduncles about the length of the leaves, with 1–3 small white flowers; bracts large, leaf-like; filaments united to or above the middle, exserted. Sandy soil, along the railway; June–August; Muscatine county.

CUSCUTACEAE *Dumort.* Dodder Family.

Annuals, with dextrorsely twining whitish or yellow stems, minute alternate scales instead of leaves, and mostly 5-parted flowers. The young plants attach themselves to various herbs or shrubs by means of suckers, the root and lower portion soon perishing. Flowers mostly white, small, in cymose clusters. Calyx inferior, 5-cleft or 5-parted or of 5 distinct sepals. Corolla 5-cleft, with 5 fimbriate or crenulate scales in the tube. Stamens 5, alternate with the corolla-lobes, inserted above the scales, exserted or included. Ovary globose or oblong, 2-celled, 4-ovuled; styles 2, terminal, usually separate. Represented by the genus Cuscuta L.

* *Calyx gamosepalous.*

† *Flowers nearly sessile; corolla persistent at the base of the capsule.*

C. arvensis Beyrich. Stems low, pale, slender; flowers small; calyx-lobes obtuse, those of the corolla acuminate; scales ovate, deeply fringed all around. Rare; growing on Artemisia and other herbs; July–August; Lyon, Emmet, and Decatur counties.

C. chlorocarpa Englm. Stems low, coarse, orange-yellow, branching; flowers white, short-pedicelled or sessile; calyx and corolla with four or five acute lobes; scales usually wanting or small and 2-cleft, or of a few teeth. On Polygonums and various herbs; July–September; forms from Emmet, Johnson, Henry, and Muscatine counties have been referred to this species. (*C. polygonorum* Englm.)

† † *Flowers pedicelled; corolla-lobes incurved.*

C. inflexa Englm. Flowers pedicelled; calyx and corolla 4–5-parted, lobes of the corolla acute, erect, inflexed, crenulate; scales a few teeth; capsule brown, capped by the remains of the corolla. Thickets, on Corylus, etc.; rare; Decatur county; reported from Fayette, Poweshiek, and Story counties. (*C. coryli* Englm.)

† † † *Flowers pedicelled; corolla-lobes spreading.*

C. tenuiflora Englm. Stems coarse, yellow, climbing high; flowers sometimes in 4's, in compound cymes, pedicels thick; calyx-lobes and corolla-lobes oblong, obtuse; scales included, fringed; styles longer than the ovary. Low grounds; July–August; frequent, on Vernonia, Solidago, Xanthium, Salix, Urtica, etc.; Emmet, Winneshiek, Johnson, and Decatur counties; reported from Fayette, Benton, Story, and Lee counties. (*C. cephalanthii* Englm).

C. gronovii Willd. Flowers more or less densely panicled, 5-parted; corolla-tube campanulate, exceeding the calyx; lobes obtuse, entire, spreading; scales much fringed above, sparingly along the sides. Most soil; July–August; frequent; Story, Muscatine, and Lee counties; no doubt more generally distributed than our present information indicates.

* * *Calyx of 5 distinct sepals, subtended by similar bracts.*

C. glomerata Choisy. Flowers sessile, white, in dense rope-like twists; the stems slender, decaying early between the flower masses; calyx of 5 distinct sepals, subtended by oblong scarious imbricated bracts; corolla-lobes obtuse, oblong-lanceolate, recurved or spreading. Low grounds, mostly on Compositae; July–September; frequent; Winneshiek, Allamakee, Jackson, Johnson, Muscatine, Henry, Decatur, Taylor, Emmet, Dickinson, and Lyon counties; reported from Fayette, Scott, Story, and Woodbury counties. (*C. paradoxa* Raf.)

SOLANACEAE *Pers.* POTATO FAMILY.

Herbs or shrubs, with watery juice, alternate, rarely opposite, exstipulate leaves, and regular 5-parted flowers. Calyx persistent. Corolla imbricate or valvate in the bud. Stamens 5, equal, inserted on the corolla and alternate with its lobes; anthers 2-celled. Style and stigma 1. Fruit a capsule or a berry, usually 2-celled, rarely 3–5-celled. An order with rank-scented leaves and poisonous or narcotic fruits; a few as the tomato, potato, etc., are edible.

* *Fruit a berry.*

SOLANUM. Anthers connivent, opening apically by two pores.

PHYSALIS. Anthers separate; calyx becoming inflated; ovary 2-celled.

NICANDRA. Anthers separate; calyx much inflated in fruit; ovary 3–5-celled.

*** Fruit a nearly dry berry; calyx unaltered.*

LYCIUM. Shrubby; berry small, 2-celled.

**** Fruit a spiny capsule.*

DATURA. Flowers large; stamens included.

SOLANUM L. Corolla rotate, with a short tube, 5-cleft. Anthers erect, longer than the filaments, connivent or connate around the style, opening apically by two pores or chinks. Fruit a 2-celled berry.

** Glabrous or pubescent, not prickly.*

S. nigrum L. *Nightshade.* Annual, rarely perennial; stem 1–2 feet high, erect or spreading, smoothish; leaves ovate, thin, angulately toothed; flowers small, white, in drooping axillary umbel-like clusters; peduncle long and slender; berry globose, black. Fields and waste places; July–September; common.

S. tuberosum L. The common potato, occasionally an escape, but not persistent.

S. triflorum Nutt. Annual, glabrous or sparingly pubescent; stem 1–3 feet high, branched; leaves pinnatifid; peduncles with 1–3 small white flowers; berry globose, green. Reported from Fayette county.

*** Stellate-pubescent and prickly plants.*

† Berry smooth, not covered by the calyx.

S. caroliniense L. *Horse-Nettle.* Perennial, with stellate-pubescence and scattered yellow prickles on the stem and veins; leaves angulately lobed; flowers white, racemose; anthers large, equal; berry spheroidal, naked, yellow. Waste grounds, fields; June–August; common in the west counties, spreading eastward and frequent in many localities.

S. torreyi Gray. Perennial, hoary with stellate-pubescence, prickly; leaves ovate sinuately 5–7-lobed, the lobes entire or undulate, obtuse; flowers showy; corolla violet; berry globose, yellow. Reported from southern Iowa.

† † Berry covered by the spiny calyx.

S. rostratum Dunal. *Sand Bur.* Annual; pubescence stellate; stem and veins thickly beset with long prickles; leaves sinuately lobed or pinnatifid; flowers yellow; calyx prickly, enclosing the fruit; stamens and style declined, lower stamen longer. Waste places; May–September; frequent in the west counties, infrequent eastward, spreading. This species has been found in fifty-one counties. A noxious weed of the worst type.

S. heterodoxum Dunal. Annual, glandular-pubescent, somewhat stellate-pubescent on the leaves, armed with yellow subulate prickles; leaves bipinnatifid; flowers violet; four of the stamens yellow, the fifth violet and longer. Reported from Fayette county.

PHYSALIS L. GROUND CHERRY. Annual or perennial herbs, with entire or sinuately toothed leaves. Calyx 5-cleft, persistent, reticulated, at length inflated and enclosing the fruit. Corolla yellowish, campanulate-rotate, tube short, obscurely 5-lobed. Stamens 5, connivent; anthers opening lengthwise. Peduncles axillary, 1-flowered. Fruit a 2-celled berry.

** Annuals with fibrous roots, perennial in P. philadelphica.*

† Plants more or less pubescent; fruiting calyx sunken at the base.

P. pubescens L. Stem 1–2 feet high, branched, at length decumbent, pubescent, sharply angled; leaves ovate or cordate, varying from entire to angulately-toothed; calyx 5-angled; corolla spotted; anthers purplish. Damp soil; July–September; frequent.

P. pruinosa L. Stem stout, usually erect, hairy, obtusely angled; leaves ovate, cordate, usually oblique at the base, more or less deeply sinuately toothed; fruiting calyx rounded; anthers yellow or tinged with purple. Fields; July–September; reported from Iowa; probably confused with the preceding.

† † Plants glabrous; fruiting calyx not sunken at the base.

P. angulata L. Stem erect, 1–3 feet high, glabrous, angular; leaves ovate, with long acuminate teeth, thin, base more or less cuneate; anthers somewhat purplish. Fields; July–September; infrequent; Fremont county; forms from Johnson and Taylor counties have been referred to this species.

P. philadelphica Lam. Annual or perennial; stem 2–5 feet high, angled, branched, glabrous, or slightly pubescent; leaves ovate or ovate-lanceolate, acuminate, entire or repand-denticulate, usually thin; corolla yellow or yellowish, throat purplish; anthers somewhat purplish; fruiting calyx 10-angled; berry red or purple, filling or bursting the calyx. Fields and waste places; July–September; infrequent; Page and Fremont counties; forms have been referred to this species from Winneshiek, Allamakee, Fayette, Jones, Des Moines, Lee, Story, Calhoun, and Pottawattamie counties.

** * Perennials by short and thick or running rootstocks.*

† Pubescence little or none; fruiting calyx scarcely sunken at the base.

P. longifolia Nutt. Perennial, rootstock thick, stem 1–3 feet high, slightly angled, branched, glabrous; leaves lanceolate, oblanceolate, or linear, repand or nearly entire; corolla yellow, with a dark center; anthers yellow; fruiting calyx ovoid; berry yellow. Prairies and open woods; July–September; infrequent; Allamakee county. (*P. lanceolata* var. *laevigata* Gray.)

P. lanceolata Mx. Perennial, stem 4–16 inches high, more or less pubescent with simple or 2–3-forked hairs; leaves spatulate or oblanceolate, usually entire, rarely undulate or angulately toothed; anthers yellow; berry reddish. Fields and prairies; June–September; common.

† † Pubescence sparce; fruiting calyx deeply sunken at the base.

P. virginiana Mill. Rootstock thick, somewhat fleshy; stem 1–3 feet high, erect, branched, angular, somewhat strigose-hairy; leaves ovate-lanceolate, tapering both ways, more or less sinuately-dentate; corolla sulphur-yellow, with purplish spots; anthers yellow; fruiting calyx pyramidal-ovoid, 5-angled, base sunken; berry reddish. Rich soil; June–September; infrequent; Decatur county; reported from other localities but probably confused with the following.

† † † Pubescence dense, more or less viscid or glandular.

P. heterophylla Nees. Rootstock slender, creeping; stem 1–3 feet high, erect, at length decumbent and spreading, villous, viscid and glandular; leaves broadly cordate, acute, sinuately toothed or nearly entire; corolla greenish yellow, with a brownish or purplish center; anthers usually yellow; berry yellow. Rich soil; July–September; common. (*P. virginiana* Mill. of Gray's Manual but not of Miller). This is a very variable species and the following varieties have been recognized as belonging to our flora. The variety AMBIGUA (Gray) Rydberg, upright, long-villous, scarcely viscid; flowers larger than those of the type; anthers purplish. The variety NYCTAGINEA (Dunal) Rydberg, leaves dark green, firm, acuminate, nearly subentire, pubescent mainly on the veins beneath.

NICANDRA Adans. An erect glabrous annual, with alternate petioled thin sinuate-dentate or lobed leaves, and solitary axillary nodding flowers.

Calyx 5-parted, much inflated in fruit, its segments ovate, sagittate at the base. Corolla obscurely 5-lobed, light blue, campanulate. Stamens 5, included. Ovary 3–5-celled; style slender; stigma 3–5-lobed. Berry globose, nearly dry.

N. physaloides Gaertn. *Apple-of-Peru.* Stem 2–5 feet high, angled; leaves ovate or oblong. Fields and waste places; July–September; infrequent; Muscatine and Fremont counties.

LYCIUM L. Represented with us by a small shrub. Leaves small, alternate, entire. Calyx campanulate, 3–5-lobed, not enlarged in fruit, persistent. Stamens 5, slightly exserted. Ovary 2-celled; style slender. Berry oval, orange red.

L. vulgare Dunal. *Matrimony Vine.* A low shrub, with long slender recurved branches, lanceolate oblong or spatulate leaves, and greenish-purple flowers. Frequent in cultivation but rarely escaped to roadsides and waste places; May–August; Muscatine, Henry, Des Moines, Lee, Appanoose, Decatur, and Page counties.

DATURA L. Ill-scented annuals, with ovate angulately toothed leaves, and large axillary short-peduncled flowers. Calyx prismatic, deciduous in fruit by a transverse scission near the base. Corolla funnelform, the limb 5-toothed. Stamens 5, perfect, included. Style 1; stigma 2-lipped. Fruit a spiny capsule, globular, 2 celled at the top, below 4-celled by a false partition.

D. stramonium L. *Jimson-weed. Thorn-Apple.* Stem green, 1–5 feet high; corolla white. Waste grounds; June–September; frequent.

D. tatula L. Stem purple; corolla bluish-white. With the preceding; June–September; frequent.

Lycopersicum esculentum Mill. The common tomato, is rarely found as an escape in waste places. (*Lycopersicon lycopersicum* (L.) Karsten).

SCROPHULARIACEAE *Lindl.* FIGWORT FAMILY.

Ours herbs, with alternate or opposite exstipulate leaves, and irregular mostly 5-parted flowers. Leaves variously modified. Corolla imbricated in the bud, 2-lipped or nearly regular. Stamens 2–5, inserted on the tube of the corolla, didynamous or equal, 1–3 of them usually rudimentary. Ovary free, 2-celled; style 1, stigma 2-lobed. Fruit a 2-celled many-seeded capsule.

Sub-order **ANTIRRHINIDEAE** Bentham. Upper lip of the corolla usually covering the lower.

Tribe **Verbasceae.** Leaves alternate; flowers spicate or racemose; corolla rotate, its lobes subequal.

VERBASCUM. Stamens 5, all antheriferous.

Tribe **Antirrhineae.** Leaves opposite; flowers racemose; corolla tubular, spurred below.

LINARIA. Corolla with a slender spur; stamens 4; capsule opening near the summit.

Tribe **Cheloneae.** Leaves opposite; flowers in cymose or umbel-like clusters, often collectively paniculate; corolla tubular or irregular, 2-lipped, not saccate or spurred; stamens 4 and a rudimentary fifth.

SCROPHULARIA. Corolla small, globose, 4 of its lobes erect, the fifth reflexed; fifth stamen a scale from the upper lip.

PENTSTEMON. Corolla tubular; fifth stamen as long as the others; seeds angular, wingless.

CHELONE. Calyx with three bracts at the base; corolla tubular, inflated, fifth stamen shorter, seeds winged.

COLLINSIA. Corolla blue and white, 2-cleft, saccate above, fifth stamen gland-like.

Tribe **Gratioleae.** Leaves mostly opposite; flowers solitary, axillary; stamens with anthers 2–4, fifth stamen wanting.

MIMULUS. Leaves simple; calyx 5-angled, 5-toothed, corolla elongated; stamens 4.

HERPESTIS. Leaves simple; calyx-segments unequal, the upper one the largest; stamens 4.

CONOBEA. Leaves pinnately parted; calyx 5-parted; corolla short; stamens 4.

GRATIOLA. Leaves simple; stamens with anthers 2, the sterile short or wanting.

ILYSANTHES. Leaves simple; stamens with anthers 2; the sterile exserted.

Sub-order **RHINANTHIDEAE** Benth. Under lip or the lateral lobes covering the upper lip in the bud.

Tribe **Digitaleae.** Leaves alternate, opposite, verticillate or basal; flowers racemose; calyx 4-parted; stamens 2–4; anthers 2-celled.

VERONICA. Leaves opposite or verticillate, corolla rotate or salverform, nearly regular; stamens 2.

SYNTHYRIS. Leaves alternate and basal; corolla campanulate, 2-4-lobed, irregular; stamens 2-4.

Tribe **Gerardieae.** Leaves opposite or the upper alternate; stamens 4, in pairs; anthers 2-celled.

GERARDIA. Stamens didynamous, included.

SEYMERIA. Stamens nearly equal, scarcely if at all exserted.

Tribe **Euphrasieae.** Leaves alternate or opposite; flowers racemose or spicate; corolla tubular, 2-lipped, upper lip arched or curved; stamens didynamous.

CASTILLEJA. Leaves alternate; anther-cells unequal, separate; capsule many-seeded.

PEDICULARIS. Leaves alternate or opposite; anther-cells equal, not separate; capsule many-seeded.

MELAMPYRUM. Leaves opposite; anther-cells equal; capsule 1-4-seeded.

VERBASCUM L. *Mullein.* Biennial, with alternate leaves, and ephemeral racemose or spicate flowers. Calyx 5-parted. Corolla rotate, with 5 subequal lobes. Stamens 5, perfect, 3 or 5 filaments bearded.

V. thapsus L. *Common M.* Woolly throughout; stem 2–5 feet high, rarely branched; leaves entire, oblong-ovate, decurrent; flowers in a dense spike, yellow; the 3 upper stamens bearded. Fields and waste places; July–August; common.

V. blattaria L. *Moth M.* Stem 2–4 feet high, simple or branched, smoothish; leaves oblong, ovate or lanceolate, clasping, coarsely dentate, lower leaves often lyrate, petioled, doubly serrate, laciniate or pinnatifid; flowers in a loose raceme, yellow or white with a purplish tinge; stamens bearded with violet hairs. Waste places; July–August; frequent; Johnson and Van Buren counties; reported from Muscatine and Story counties.

LINARIA Juss. Calyx 5-parted. Corolla spurred at the base, 2-lipped, upper lip 2-lobed, lower 3-lobed; throat almost closed by a prominent palate. Stamens 4. Style slender; stigma scarcely lobed. Capsule thin, many-seeded; opening irregularly near the summit.

L. vulgaris Mill. *Butter and Eggs.* Perennial; stem 1–3 feet high, glabrous; leaves alternate, linear, entire, sessile; flowers yellow, in a dense raceme, spur long, slender; seeds winged. Fields and roadsides; July–September; infrequent throughout the eastern half of the state; Winneshiek, Clayton, Louisa, Johnson, Henry, Des Moines, Lee, Wapello, Van Buren, Appanoose, Decatur, Page, Clark, and Webster counties; reported from Fayette, Muscatine, and Story counties. (*L. linaria* (L.) Karst.)

L. canadensis (L.) Dumort. Annual or biennial; leaves linear or linear-oblong; flowers blue and white, in a long slender raceme; spur filiform, curved. Sandy soil; June–September; reported by Arthur from Linn and Benton counties.

SCROPHULARIA L. Coarse perennials, with opposite leaves, and small greenish purple cymose flowers. Calyx 5-parted. Corolla short, 5-lobed, 4 lobes erect, the fifth reflexed; tube globose. Stamens included, 4, and a rudimentary fifth on the upper side of the throat of the corolla.

S. marylandica L. *Figwort.* Stem 3–7 feet high, 4-angled, glabrous, branching; leaves large, ovate or ovate-lanceolate, thin, acuminate, sharply serrate; cymes in a slender terminal thyrse-like panicle; corolla brownish, purple within; sterile stamen deep purple. Woods; June–August; common.

PENTSTEMON Solander. BEARD-TONGUE. Perennials, simple or branched from the base. Leaves opposite, the upper sessile, the lower petioled. Flowers thyrsoid or racemose-panicled, showy. Calyx 5-parted. Corolla tubular, often inflated or campanulate, usually 2-lipped, upper lip 2-lobed, lower 3-lobed. Stamens 5, 4 antheriferous, declined below, ascending above, the 5th sterile. Capsule ovoid-conical, with many angular seeds.

P. pubescens Solander. Stem 1–3 feet high, downy-pubescent; leaves oblong to lanceolate, denticulate or entire, radical leaves ovate or oblong; flowers in a narrow panicle; corolla pale-purple, gradually dilated, throat nearly closed by 2-bearded folds from the lower lip; sterile filament bearded. Hills and bluffs; June; frequent; Muscatine, Henry, Appanoose, and Lyon counties; reported from Scott county. (*P. hirsutus* (L.) Willd.)

P. digitalis (Sweet) Nutt. Stem 2–5 feet high, glabrous; leaves ovate-lanceolate, usually serrulate; the basal oval or oblong; corolla white, inflated, campanulate, throat open, beardless; sterile filament thinly bearded. Woods; June; frequent; Muscatine, Louisa, Lee, Johnson, Appanoose, and Lyon counties.

P. gracilis Nutt. Stem 6–18 inches high, glabrous or nearly so below; basal or lower leaves linear-oblong or spatulate, denticulate or entire, the upper linear-lanceolate or lanceolate, denticulate; inflorescence glandular-pubescent; corolla purple. Prairies; May–June; infrequent; Lyon county.

P. grandiflorus Nutt. Stem 2–3 feet high, glabrous, glaucous; cauline leaves oblong or oval, thick, entire clasping or perfoliate; the basal obovate; corolla large, campanulate, nearly regular, lavender-blue; sterile filament incurved at the apex, puberulent. Sandy soil; June–August; not common; Muscatine, Louisa, Fremont, Pottawattamie, and Lyon counties; reported from Dubuque, Delaware, Black Hawk, and Woodbury counties.

CHELONE L. TURTLE-HEAD. Erect perennials, with angled stems, and opposite petioled leaves. Flowers axillary, nearly sessile, in clusters; calyx with three bracts, 5-parted, segments ovate or lanceolate. Corolla tubular, inflated, 2-lipped, much longer than the calyx; upper lip arched, notched at the apex or entire, lower lip 3-lobed, bearded in the throat. Stamens 4, with woolly filaments and anthers, fifth stamen rudimentary. Seeds with a membranous wing.

C. glabra L. Stem slender, 1–5 feet high; leaves sessile or short-petioled, narrowly lanceolate, tapering both ways, appressed serrate; flowers clustered, white or roseate, bracts not ciliate. Wet places; infrequent; July–September; Winneshiek, Allamakee, Dubuque, Muscatine, and Johnson counties; reported from Fayette county.

C. obliqua L. Stem slender, 1–4 feet high; leaves broadly lanceolate or oblong, incisely serrate; flowers rose-purple, bracts ciliolate. Wet grounds, in thickets; August–September; infrequent; Muscatine, Des Moines, and Jefferson counties.

COLLINSIA Nutt. Low delicate annuals or biennials, with opposite leaves, and axillary or terminal umbellate flowers. Calyx 5-cleft. Corolla 2-lipped, upper lip 2-cleft, lower lip 3-lobed; tube saccate. Stamens 4, and a rudimentary gland-like fifth.

C. verna Nutt. Stem 6–18 inches high, branched, glabrous or puberulent; leaves clasping, ovate or ovate-lanceolate; peduncles slender; whorls of 2–6 flowers; corolla blue and white, twice the length of the narrow calyx-teeth. April–May; frequent locally; Jefferson county; reported from Lee county.

MIMULUS L. MONKEY-FLOWER. Stems square, prostrate or erect. Leaves simple, opposite. Flowers peduncled, axillary, solitary. Calyx 5-angled, 5-toothed, the upper tooth the largest. Corolla ringent, 2-lipped; upper lip 2-lobed, the lower lip 3-lobed. Stamens 4. Stigma 2-lobed. Capsule many-seeded.

* *Corolla violet, rarely white.*

M. ringens L. Perennial; stem 1–3 feet high, glabrous; leaves lanceolate, sessile, acuminate, entire or serrate, base cordate-clasping; peduncle longer than the calyx; calyx-teeth nearly equal; corolla violet, rarely white, throat closed by prominent folds. Along ditches and in wet grounds; July–August; common.

M. alatus Solander. Perennial, glabrous; stem narrowly winged at the angles; leaves ovate, ovate-lanceolate or oblong, acuminate, conspicuously serrate, margined-petioled; peduncle shorter than the calyx; corolla violet. Wet woods; July; Appanoose and Decatur counties.

* * *Corolla yellow.*

M. jamesii T. & G. Perennial by stolons; stems spreading, diffuse, rooting, smooth; leaves roundish, obscurely serrate, sessile or petioled, palmately-veined; calyx ovate, oblique, upper tooth longest, inflated in fruit; corolla yellow, lower lip bearded, throat open. Calcareous springs, wet ravines; May–June; Winneshiek and Des Moines counties.

CONOBEA Aubl. Ours an annual herb, with opposite pinnately parted leaves, and small greenish-white axillary mostly solitary flowers. Calyx 5-parted, the segments narrow, equal. Corolla irregular, tube cylindric, the limb 2-lipped; upper lip 2-lobed; lower lip 3-lobed. Stamens 4, didynamous, included. Capsule narrowly ovoid, glabrous, many-seeded.

C. multifida (Mx.) Benth. Stem 4–8 inches high, at length diffusely branched; leaves petioled, segments linear or linear-oblong, obtuse, entire or incised. Shores of streams and rivers; July–September; reported from Fayette, Muscatine, and Lee counties.

HERPESTIS Gaertn. Ours a perennial by stolons, with opposite entire leaves, and small blue peduncled axillary flowers. Calyx 5-parted. Corolla 2-lipped; upper lip 2-lobed, lower lip 3-lobed. Stamens 4, didynamous, included. Capsule oblong, obtuse, many-seeded.

H. rotundifolia (Mx.) Pursh. Stems creeping, spreading, simple or branched; villous-pubescent; leaves obovate to orbicular, palmately veined; flowers 1 or 2 in the axils. Muddy shores; June–September; reported from Scott county. (*Monniera rotundifolia* Mx.)

GRATIOLA L. Low herbs, with opposite sessile leaves, and solitary axillary peduncled flowers. Calyx 2-bracted near the base, 5-parted, divisions slender, nearly equal. Corolla 2-lipped; upper lip entire or 2-cleft, lower 3-cleft. Stamens included, 2 antheriferous, posterior, the anterior 2 rudimentary and sterile or wanting. Capsule 2-celled, 4-valved, many-seeded.

G. virginiana L. Stem 4–7 inches high, much-branched, glandular-puberulent; leaves oblong or oblong-lanceolate, remotely toothed; peduncles slender, as long as the leaves; bracts leaf-like, equaling the calyx; flowers white or pale yellow; sterile filaments minute or wanting. Low grounds, fields and woods; June–August; frequent; Winneshiek, Fayette, Johnson, Muscatine, Henry, Appanoose, Wayne, Decatur, and Ringgold counties.

ILYSANTHES Raf. Annuals, with opposite sessile leaves, and small purplish axillary flowers on slender naked pedicels. Calyx 5-parted, divisions nearly equal. Corolla 2-lipped; upper lip erect, 2-lobed, lower spreading 3-cleft. Fertile stamens 2; sterile stamens 2, forked, one division glandular. Stigma 2-lobed. Capsule ovate or oblong, about equaling the calyx, many-seeded.

I. riparia Raf. Stem 3–7 inches high, branched, spreading or erect; leaves ovate, ovate-oblong, or the lower obovate, obscurely toothed. River banks, July–August; frequent; Fayette, Johnson, Van Buren, Decatur, Ringgold, Emmet, Chickasaw, and Sioux counties; reported from Muscatine, Story, and Woodbury counties. (*I. gratioloides* (L.) Benth.)

VERONICA L. SPEEDWELL. Annual or perennial herbs, with opposite alternate or verticillate leaves, and solitary racemose or spicate flowers. Calyx usually 4-parted. Corolla rotate or salverform, usually 4-lobed, rarely 5-lobed; lower segments usually narrow. Stamens 2, exserted. Style slender; stigma capitate. Capsule flat or compressed, obtuse or obcordate, many-seeded.

* *Perennials; leaves verticillate; flowers in terminal spikes.*

V. virginica L. *Culver's-root.* Stem 2–6 feet high, smooth or somewhat downy; leaves 3–6 in a whorl, lanceolate, short-petioled, pointed, serrate; flowers in terminal panicled spikes; parts sometimes in 5's; corolla small, white or bluish; stamens and style much exserted; capsule oblong, obtuse. Woods and prairies; July–August; common. (*Leptandra virginica* (L.) Nutt.)

* * *Perennials; flowers in axillary racemes.*

V. anagallis L. *Water Speedwell.* Stems fleshy, 1 foot high, smooth, decumbent and rooting, then erect; leaves opposite, sessile, clasping entire; racemes from opposite axils; flowers small, corolla bluish; capsule orbicular, slightly notched. Springs and brooks; June–July; frequent; Emmet, Winneshiek, Allamakee, Louisa, Johnson, Lyon, Winnebago, and Appanoose counties; reported from Fayette and Story counties. (*V. anagallis-aquatica* L.)

V. americana Schwein. Similar to the preceding, stoloniferous, glabrous; stem branched, decumbent; leaves ovate, oblong, or oblong-lanceolate, petioled, serrate, bases truncate, rounded, or subcordate, apex acutish or obtuse. Swamps and streams; April–September; reported from Lee county.

* * * *Annuals; flowers solitary in the axils of the leaves.*

V. peregrina L. Stem 4–10 inches high, smoothish, ascending, branched; lower leaves petioled, oval-oblong, toothed, upper sessile, oblong-linear, entire; flowers short-pedicelled, solitary; corolla white, shorter than the calyx; capsule obcordate. Moist soil; May–September; common; Winneshiek, Johnson, Henry, Lee, Decatur, Dallas, and Shelby counties; reported from Fayette, Scott, Muscatine, and Story counties.

V. arvensis L. *Corn Speedwell.* Stem hairy, 3–9 inches high, simple or diffusely branched; lower leaves petioled, ovate, crenate, the upper sessile, ovate or lanceolate, entire; flowers very small, axillary; capsule obovate, obcordate. Grassy places in a cultivated soil and open woods; May–September;

frequent; Muscatine, Johnson, and Henry counties; reported from Winneshiek, Scott, Lee, and Story counties.

* * * * *Perennial; flowers in spicate racemes.*

V. serpyllifolia L. Glabrous or puberulent; stems slender, decumbent, the branches 2–10 inches high, erect; leaves opposite, petioled, or the uppermost sessile, ovate, oval, or oblong, entire or crenulate; flowers in short spicate racemes, corolla pale blue or whitish; capsule broader than long, notched at the summit. Fields; April–August; reported from Johnson county.

SYNTHYRIS Benth. Ours a pubescent perennial herb, with ovate or orbicular petioled basal leaves, sessile bract-like alternate cauline leaves, and greenish yellow flowers in a terminal bracteate spike. Calyx 4–5-parted, bracts oblong or linear. Corolla usually 2-lobed, sometimes 3–4-lobed. Stamens usually 2, sometimes 4. Ovary 2–3-celled; style slender; stima capitate. Capsule compressed, emarginate, many-seeded.

S. houghtoniana Benth. Stem 1–2 feet high, basal leaves truncate or cordate at the base, crenulate, 5–7-nerved, cauline leaves small, somewhat clasping, crenulate. Sandy open woods; May–July; infrequent or rare; Muscatine county; reported from Fayette and Scott counties. (*Wulfenia houghtoniana* (Benth.) Greene.)

GERARDIA L. Annual or perennial erect and branched herbs, with opposite or alternate leaves, and showy racemose paniculate or solitary and axillary rose-purple varying to white or yellow flowers. Calyx campanulate, 5-toothed or 5-lobed. Corolla tubular, varying to campanulate or funnelform, limb 5-lobed, the 2 upper lobes usually smaller and somewhat united. Stamens 4, didynamous, included. Style slender, thickened at the apex. Capsule globose or ovoid, pointed, many-seeded.

* *Corolla yellow, the tube woolly; anthers awned at the base; leaves rather large, more or less incised or pinnatifid; perennials.*

G. grandiflora Benth. Stem minutely downy, 2–4 feet high, branched; leaves ovate-lanceolate, incisely cut or pinnatifid; pedicels about the length of the calyx; corolla about 2-inches long, yellow. Open woods; July–August; frequent; Muscatine, Henry, Van Buren, Jefferson, and Appanoose counties. (*Dasystoma grandiflora* (Benth.) Wood.)

G. flava L. Downy grayish; stem 2–4 feet high, usually simple; leaves lanceolate, ovate-lanceolate, or oblong, entire or the lower sinuate-toothed or pinnatifid, short-petioled or the upper sessile. Woods and thickets; July–August; forms from Clinton, Jones, Johnson, and Henry counties have been referred to this species. (*Dasystoma flava* (L.) Wood.)

* * *Anthers awnless; flowers pedicelled, purple or pink; annuals.*

† *Pedicels shorter or scarcely longer than the calyx and capsule.*

G. aspera Dougl. Stem somewhat branched, 1–2 feet high, hispidulous-scabrous; leaves narrowly linear, rough-hispid; pedicels equaling or about twice the length of the calyx; calyx-lobes triangular-lanceolate, shorter than the tube; corolla 1 inch long, purple. Prairies; August–September; infrequent; Delaware, Henry, Decatur, and Lyon counties; reported from Fayette, Scott, Story, and Emmet counties.

G. purpurea L. Stem 1–2 feet high, glabrous, branched; leaves narrowly linear, rough-margined; flowers racemose, purple, pedicels usually shorter than the calyx. Fields and meadows; August–September; infrequent; Emmet county; reported from Fayette and Hamilton counties.

† † *Pedicels slender, usually exceeding the corolla; anther-sacs mucronate at the base.*

G. tenuifolia Vahl. Stem about 10 inches high, glabrous, paniculately branched; leaves narrowly linear; pedicels exceeding the corolla, often longer than the leaves, slender; calyx small, with 5 short acute teeth; corolla light purple, about one-half inch in length; capsule globose, scarcely exceeding the calyx. Low grounds in fields and woods; August–September; common; Winneshiek, Delaware, Johnson, Washington, Jefferson, Henry, Des Moines, Emmet, and Lyon counties; reported from Fayette, Scott, Muscatine, Story, and Harrison counties.

G. besseyana Britton. Similar to the preceding, stouter; leaves larger, scabrous; corolla purple; calyx-teeth triangular-subulate, about one-third the length of the tube; capsule globose, exceeding the calyx. Dry soil; July–September; reported from Fremont and Pottawattamie counties. (*G. tenuifolia* var. *macrophylla* Benth. of Gray's Manual.)

* * * *Flowers sessile; anthers pointless, those of the shorter stamens smaller.*

G. auriculata Mx. Annual, rough-hairy; stem 1–2 feet high, simple or branched above; leaves lanceolate or ovate-lanceolate, acuminate, sessile, entire, many with an oblong or lanceolate lobe on one side at the base; flowers solitary, sessile, purple. Low prairies; July–September; frequent; Johnson, Henry, and Decatur counties; reported from Fayette, Scott, Story, and Emmet counties.

SEYMERIA Pursh. Erect branching perennials, with opposite dissected or entire leaves, and yellow flowers. Calyx campanulate, 5-cleft. Corolla-tube short and broad; limb of 5 ovate or oblong nearly equal spreading lobes. Stamens 4, nearly equal.

S. macrophylla Nutt *Mullein Foxglove.* Stem 3–6 feet high, pubescent to glabrate; lower leaves pinnatifid, divisions lance-oblong, incised, upper lanceolate, serrate or entire; flowers short-pedicelled, axillary, in a long interrupted spike; corolla woolly inside; filaments woolly; style short; capsule globose or ovoid, flat mucronate pointed, many-seeded. Woods near water courses; July–August; frequent; Muscatine, Johnson, Des Moines, Van Buren, Decatur, and Page counties. (*Afzelia macrophylla* (Nutt.) Kuntze.)

CASTILLEJA Mutis. Roots parasitic. Leaves alternate, sessile, entire or cut-lobed, the floral often colored. Flowers in leafy bracted spikes. Calyx 2–4-cleft. Corolla 2-lipped; upper lip long, linear, arched and keeled; lower lip short, 3-lobed; corolla-tube short, included by the calyx. Stamens 4, didynamous, enfolded by the upper lip. Anthers 2-celled; cells oblong-linear, unequal, outer cell suspended, inner pendulous.

C. coccinea (L.) Spreng Annual or biennial, hairy, stem 8–16 inches high; radical leaves clustered, obovate or oblong, entire; cauline leaves incisely cut into segments; floral bracts 3–5-cleft, scarlet; calyx 2-cleft; corolla scarcely longer, pale yellow. Sandy soil in open woods; May–July; frequent; Winneshiek, Delaware, Johnson, Appanoose, and Cerro Gordo counties; reported from Fayette, Scott, and Muscatine counties.

C. sessiliflora Pursh. Perennial; stem 6–14 inches high, grayish pubescent; leaves oblong-linear, entire or 5-cleft, divisions narrow, diverging; floral leaves similar; calyx deeply cleft; corolla long. Prairies; frequent westward; May–July; Emmet, Delaware, Story, Hardin, Hamilton, Shelby, and Lyon counties; reported from Fayette and Woodbury counties.

PEDICULARIS L. *Lousewort.* Perennials. Leaves pinnatifid, floral bract-like. Flowers yellow, spicate. Calyx inflated, 2-5-cleft. Corolla

2-lipped; upper lip vaulted, covering the 4-stamens; lower lip spreading, 3-lobed. Anther-cells equal.

P. canadensis L. *Common L.* Hairy, stems usually tufted, 6–12 inches high; leaves alternate, petioled, pinnatifid, segments toothed; flowers in a dense spike; calyx incised in front, oblique; upper lip of corolla hooded, incurved, with 2 teeth. Capsule flattish, sword-beaked. Fields and woods; May–July; common; Winneshiek, Allamakee, Clayton, Johnson, Decatus, Story, Pottawattamie, Shelby, Calhoun, Hancock, Cerro Gordo, Dallas, Emmet, and Lyon counties; reported from Fayette, Scott, and Muscatine counties.

P. lanceolata Mx. Stem 1–2 feet high, somewhat hairy or glabrous; leaves mostly opposite, lance-oblong, doubly crenate-toothed; spike dense; calyx 2-lobed; upper lip of the corolla larger, covering the lower; capsule ovate, about the length of the calyx. Swampy places; August–September; frequent; Winneshiek, Johnson, Winnebago, Hancock, Emmet, and Lyon counties; reported from Fayette, Scott, and Story counties.

MELAMPYRUM L. Ours a small branching annual herb, with opposite entire petioled lanceolate or linear-lanceolate leaves, and small white or whitish flowers solitary in the upper axils or more or less spicate. Calyx 4-toothed. Corolla irregular, 2-lipped; upper lip obtuse or emarginate, lower lip 3-toothed. Stamens 4, didynamous. Capsule flat, oblique, 2–4-seeded.

M. americanum Mx. *Cow-Wheat.* Puberulent; stem 6–18 inches high, obscurely 4-sided; leaves short-petioled, the floral ovate or lanceolate, with a few bristle-pointed teeth near the base; calyx-teeth subulate; corolla thrice the length of the calyx, lower lip yellow. Dry woods; May–August; reported from Lee county.

OROBANCHACEAE *Lindl.* BROOM-RAPE FAMILY.

Herbs, destitute of green foliage, with parasitic roots, alternate scales in place of leaves, and solitary or spicate flowers. Calyx 4–5-cleft or 4–5-toothed, persistent, free from the ovary. Corolla irregular, tubular, 2-lipped, withering-persistent. Stamens 4, didynamous, inserted on the tube of the corolla; anthers 2-celled. Ovary ovoid, 1-celled, with 2–4 parietal placentae. Capsule 2-valved, many-seeded.

APHYLLON Mitchell. Brownish or whitish plants with perfect flowers. Calyx of 5 regular teeth. Upper lip of the corolla 2-lobed; lower 3-lobed. Capsule with 2 or 4 placentae.

A. uniflorum Gray. *Naked Broom-rape.* Stem short, scaly, mostly subterranean; flowers solitary, on bractless scapes which are 3–6 inches high, purplish or yellowish; calyx-lobes subulate; corolla-lobes large, obovate. Prairies or woods; May–June; infrequent; Johnson, Jefferson, and Decatur counties; reported from Story and Lee counties. (*Thalesia uniflora* (L.) Britton.)

A. ludovicianum Gray. Stems 3–10 inches high, solitary or clustered; glandular-pubescent, branched; flowers in a dense terminal spike; calyx usually with 2 bracts at the base; calyx-lobes narrowly lanceolate; corolla longer, slightly curved, upper lip but little if any 2-cleft; placentae apparently 2. Dry soil; June–August; infrequent; Lyon county. (*Orobanche ludoviciana* Nutt.)

LENTIBULARIACEAE *Lindl.* Bladderwort Family.

Terrestrial or aquatic herbs with showy solitary or racemose scapose flowers. Calyx 2-lipped, inferior. Corolla 2-lipped, irregular; upper lip entire or 2-lobed; lower lip 3-lobed, with a prominent usually bearded palate, spurred below. Stamens 2, included, inserted on the upper lip; anthers 1-celled. Ovary 1-celled, with a free central placenta, becoming a globular many-seeded capsule.

UTRICULARIA L. Aquatic or rooting in the mud, stems and dissected foliage bladder bearing. Scapes 1–few-flowered. Lips of the calyx nearly equal, nearly entire. Upper lip of the corolla erect. Filaments incurved. Stigma 2-lamellate. The species of this genus are often propagated by winter buds.

U. vulgaris L. *Greater Bladderwort.* Perennial; immersed stems 1–3 feet long; leaves many, with many bladders, 2–3-pinnately divided; scapes naked or with a few scales, 3–20-flowered, 5–12 inches high; corolla yellow, closed; spur conical, shorter than the lower lip; pedicels recurved in fruit. River sloughs and ponds; June–August; infrequent; Muscatine, Louisa, Linn, Decatur, Fremont, Story, Winnebago, and Emmet counties; reported from Fayette and Sioux counties.

U. biflora Lam. Scape 2–5 inches high, 1–3-flowered; leaves at the base of the scape root-like, capillary, bearing numerous bladders; corolla yellow, spur oblong, obtuse, equaling the lower lip; pedicels erect. Ponds; reported from Muscatine county. Associated with *Brasenia peltata* Pursh.

U. intermedia Hayne. Scape capillary, 1–4-flowered; leaves 2-ranked, crowded, 4–5 times forked, divisions linear-subulate, rigid; bladders infrequent, on leafless branches; corolla yellow, spur conical, acute. Shallow water; June–August; reported from Emmet county.

BIGNONIACEAE *Pers.* Trumpet creeper Family.

Trees or shrubs, with opposite simple or pinnate exstipulate leaves, and large showy flowers. Calyx entire, 2-lipped or 5-cleft. Corolla tubular or campanulate, 5-lobed, irregular or 2-lipped, deciduous Stamens 5, inserted on the corolla, 1–3 sterile or rudimentary. Anthers 2-celled. Ovary free; style long; stigma 2-lobed. Capsule woody, 2-valved, with many winged flat seeds.

Tecoma. Leaves pinnate.
Catalpa. Leaves simple.

TECOMA Juss. Calyx campanulate, 5-toothed. Corolla funnelform, limb with 5 nearly equal lobes. Fertile stamens 4, didynamous, the 5th rudimentary. Capsule flattish at right angles to the partition, 2-valved.

T. radicans (L.) DC. *Trumpet Creeper.* With us a glabrous woody vine; leaflets 7–11, ovate, acuminate, coarsely serrate; corolla large, orange and scarlet; stamens included. Waste places; July–September; becoming a frequent escape; Muscatine, Louisa, and Lee counties

CATALPA Scop. Calyx 2-parted. Corolla campanulate, 5-lobed, 2-lipped. Fertile stamens 2, occasionally 4, rudimentary or sterile stamens 3 or 1. Capsule terete, long, 2-celled, opening at right angles to the valve.

C. speciosa Warder. *Catawba Tree. Larger Indian Bean.* Leaves large, long-petioled, cordate, acuminate, sometimes angulately lobed, pubescent beneath; corolla large, white, slightly spotted, tube obconical, limb slightly oblique.

lower lobe emarginate; capsule 1 foot long, nearly one inch in diameter. Rich soil; June–July; frequent in cultivation, rarely an escape.

C. bignonioides Walt. *Catalpa. Indian Bean.* Similar to the preceding species; leaves strong-scented; lower lobe of the corolla emarginate; capsule smaller, thinner. Infrequent in cultivation, probably not an escape. (*C. catalpa* (L.) Karst.)

MARTYNIACEAE *Link.* UNICORN-PLANT FAMILY.

Ours a densely glandular-pubescent annual herb, with opposite broadly ovate or orbicular leaves, and perfect irregular whitish or yellowish racemose flowers. Calyx 4–5-cleft or 4–5-parted or cleft on the lower side. Corolla-tube oblique; the limb slightly 2-lipped, of 5 nearly equal lobes. Stamens with anthers 4, didynamous. Ovary 1-celled, with 2 parietal placentae, or 4-celled by the extension of the placentae in fruit. Represented with us by the genus MARTYNIA L.

M. proboscidea Glox. *Unicorn-Plant.* Stem much branched, stout, the branches prostrate or ascending, 1–3 feet long; leaves entire, undulate or repand, apex rounded, base cordate; calyx with 1–2 oblong or linear deciduous bractlets at the base; corolla mottled with purple; fruit 4–6 inches long, body straightish; beaks 2, long and strongly recurved. Alluvial soil and in waste places; July–September; infrequent; Jefferson, Linn, Taylor, and Emmet counties; reported from Harrison county. The species is a native of the Mississippi valley. Of late years it seems to assume the nature of a weed and appears by the waysides and in cultivated fields.

ACANTHACEAE *J. St. Hil.* ACANTHUS FAMILY.

Mostly herbs, with opposite simple entire exstipulate leaves, and perfect bracted flowers. Calyx 4–5-parted. Corolla tubular, limb 5-lobed, or 2-lipped, convolute in the bud. Stamens 4, didynamous, or only 2, inserted on the corolla. Style slender; stigma 2-cleft. Ovary 2-celled. Fruit a capsule, 2-celled, 4–12-seeded.

RUELLIA. Corolla convolute in the bud, nearly regular; stamens 4.
DIANTHERA. Corolla imbricated in the bud, strongly 2-lipped; stamens 2.

RUELLIA L. Perennials with tumid joints, and showy axillary flowers. Calyx 5-cleft or 5-parted; segments slender. Corolla funnelform, limb spreading, nearly equally lobed. Stamens 4, included, didynamous; anthers 2-celled. Capsule narrow, somewhat flattened.

R. ciliosa Pursh. Stem 8–30 inches high, clothed with whitish hairs; leaves sessile or nearly so, oval or ovate-oblong; flowers clustered or solitary, 2-bracted, nearly sessile, blue; calyx-segments filiform; corolla-tube 1½–2 inches in length or about twice the length of the calyx-segments, throat short, limb ample. Fields and borders of woods; June–September; common.

R. strepens L. Stem 1–4 feet high, glabrous or slightly pubescent; leaves ovate to oblong, petioled; calyx-lobes linear or lanceolate. Wooded ravines; June–July; infrequent; Decatur, Appanoose, and Henry counties.

DIANTHERA L. Ours a perennial glabrous herb, with short-petioled or sessile lanceolate or linear-lanceolate leaves, and pedunculate capitate-spicate violet or whitish flowers. Calyx 4–5-parted, the segments narrow. Corolla-tube slender, short; limb 2-lipped, upper lip entire or 2-dentate, lower lip 3-cleft, spreading. Stamens 2, inserted on the throat of the corolla. Cells of the

ovary each with 2 ovules. Capsule contracted below into a long stipe, 4-seeded.

D. americana L. Stem mostly simple, 1–3 feet high, peduncles axillary, slender; bractlets linear-subulate. Wet places; May–August; Henry county.

VERBENACEAE *J. St. Hil.* VERVAIN FAMILY.

Herbs, with opposite exstipulate leaves, and perfect more or less irregular flowers. Calyx 4–5-lobed or 4–5-cleft. Corolla 2-lipped or regular. Stamens 4, didynamous or only 2. Fruit dry or drupaceous, usually splitting into as many 1-seeded nutlets as the ovary has cells.

** Ovary 2–4-celled.*

VERBENA. Flowers spicate or in heads; nutlets 4, 1-seeded.
LIPPIA. Flowers spicate or in heads; nutlets 2.

*** Ovary 1-celled.*

PHRYMA. Flowers in slender spikes; fruit an achene.

VERBENA L. VERVAIN. Annuals or perennials, with sessile bracted flowers arranged in solitary or panicled spikes. Calyx tubular, 5-toothed, one of the teeth frequently shorter. Corolla tubular, limb somewhat unequally 5-cleft. Stamens 4, included, upper pair sometimes abortive. Style slender; stigma usually 2-lobed.

** Perennial; spikes rather thick and densely flowered; bracts small.*

V. hastata L. *Blue V.* Stem 3–6 feet high, pubescent; leaves lanceolate to oblong-lanceolate, gradually acuminate, coarsely serrate, petioled, the lower often lobed or hastate; spikes linear, many-flowered, erect, corymbed or panicled; flowers blue, sometimes roseate. Waysides and waste places; July–September; common.

V. stricta Vent. *Hoary V.* Whole plant whitish-hirsute; stem 1–2 feet high, simple or branched; leaves sessile, oval, obovate, or oblong, unequally serrate; spikes dense; flowers blue, varying to whitish. Dry soil; July–September; common.

V. angustifolia Mx. Stem 1–2 feet high, simple or branched, sparingly hirsute; leaves linear or narrowly lanceolate, serrate, tapering to the base, sessile; spikes few or solitary, slender; flowers purple or blue. Sandy soil; June–July; frequent; Allamakee, Scott, Muscatine, Johnson, Henry, Cerro Gordo, and Lyon counties.

*** Perennial; spikes filiform; bracts small.*

V. urticaefolia L. *White V.* Stem 3–5 feet high, hirsute to glabrate; leaves ovate to oblong-lanceolate, thin, petioled, serrate; spikes terminal and axillary, slender, loosely flowered; flowers small, white. Waste grounds, fields and woods; July–August; common.

**** Annual; spikes thick, leafy-bracted.*

V. bracteosa Mx. Stem much branched from the base, diffuse or decumbent, hirsute; leaves ovate, oval, or obovate, base cuneate, usually tapering to a short margined petiole, laciniately cut or 3-cleft; flowers small, blue or purple, in short thick spikes. Pastures and waysides; June–September; frequent.

***** Perennial; flowers showy, spicate.*

V. canadensis (L.) Britton. Low, branching, ascending, hirsute to nearly glabrous; stem 8–15 inches high; leaves ovate or ovate-oblong, incisely toothed, lobed, or 3-cleft; flowers showy, in pedunculate spikes, purplish or blue. Cultivated, reported from Story county as an escape. (*V. aubletia* L. of Gray's Manual.)

LIPPIA L. Ours a perennial herb, with opposite leaves, and small bracted flowers. Calyx 2-parted. Corolla funnelform, 2-lipped; upper lip notched; lower larger, 3-lobed. Stamens didynamous, included. Fruit a dry drupe, 2-celled, 2-seeded.

L. lanceolata Mx. *Fog-fruit.* Stem 4-angled, suberect, from an extensively creeping base; leaves obovate to ovate, base cuneate, mostly tapering into a petiole, serrate, pinnately veined, veins passing to the sinuses; flowers pale blue, in closely bracted heads which are on long axillary peduncles. River banks; July–September; frequent in the eastern counties but extending westward across the state; Clayton, Dubuque, Clinton, Scott, Muscatine, Louisa, Lee, Henry, Johnson, Van Buren, Wapello, Linn, Story, Chickasaw, and Fremont counties.

PHRYMA L. Perennial, with coarsely toothed ovate petioled leaves, and small purplish or roseate opposite flowers arranged in slender terminal spikes. Calyx 2-lipped; upper lip 3-toothed; the lower 2-toothed. Corolla 2-lipped; upper lip emarginate; the lower 3-lobed. Stamens included. Fruit dry, oblong, 1-celled, 1-seeded.

P. leptostachya L. *Lopseed.* Stem 2–3 feet high, somewhat pubescent, with slender branches; leaves thin, acute or acuminate, lower long-petioled, upper nearly sessile; flowers on very short 2-bracteolate pedicels, erect at first, deflexed in fruit. Rich open woods, thickets: June–August; common.

LABIATAE *B. Juss.* MINT FAMILY.

A large and natural order consisting of annual or perennial herbs, with square stems, opposite aromatic exstipulate leaves, and axillary cymose flower clusters which are frequently collected into terminal racemes, spikes, or heads. Calyx usually nerved, persistent, regular or 2-lipped, 5-lobed or 5-toothed, rarely 4-toothed. Corolla usually 2-lipped; upper lip 2-lobed or rarely entire, external in the bud; lower 3-lobed. Stamens 4, didynamous, or only 2, inserted on the tube of the corolla. Ovary superior, deeply 4-lobed, forming in fruit 4 seed-like 1-seeded nutlets or achenes. Style solitary, central, 2-lobed above.

A. Ovary 4-lobed, the style not basal; nutlets rugose reticulated, attached laterally.

Tribe **Ajugoideae.** Calyx 5–10-nerved; stamens 4, parallel, ascending, mostly exserted from the upper side of the corolla; nutlets obovoid, dry.

ISANTHUS. Corolla of 5 nearly equal lobes; stamens scarcely if at all exserted.

TRICHOSTEMA. Corolla-lobes nearly equal, declined; stamens exserted.

TEUCRIUM. Corolla irregular, deeply cleft between the two lobes of the upper lip; stamens exserted.

B. Ovary 4-parted, the style basal; nutlets smooth or granulate, attached by their bases.

Tribe **Satureineae.** Corolla 2-lipped; upper lip galeate or concave; stamens 4 or 2, not declined, the upper pair shorter or wanting; anthers 2-celled.

* *Corolla nearly equally 4-lobed; stamens erect, distant.*

MENTHA. Stamens 4; aromatic fragrant herbs.

LYCOPUS. Fertile stamens 2, the upper pair of sterile filaments or wanting.

** *Corolla more or less 2-lipped; upper lip erect, entire or notched.*

PYCNANTHEMUM. Flowers in dense capitate heads; stamens 4, lower pair a little shorter.

HEDEOMA. Flowers in axillary clusters; fertile stamens 2; the upper pair rudimentary or wanting.

Tribe **Monardeae.** Corolla strongly 2-lipped; fertile stamens 2, straight or ascending; anther-cells linear-oblong, solitary or separated by a long connective.

SALVIA. Calyx 2-lipped; stamens inserted on the throat of the corolla; connective linear or filiform, transverse.

MONARDA. Calyx nearly equally 5-toothed, 15-nerved; anther cells confluent into one.

BLEPHILIA. Calyx 2-lipped, 13-nerved; anther-cells confluent.

Tribe **Nepeteae.** Calyx about 15-nerved; stamens 4, all fertile; the upper pair the longer; corolla 2-lipped.

LOPHANTHUS. Stamens exserted; anther-cells parallel.

NEPETA. Stamens not exserted; anther-cells divergent.

DRACOCEPHALUM. Stamens exserted; anther-cells divergent.

Tribe **Scutellarineae.** Calyx 2-lipped, closed in fruit, lips entire; corolla 2-lipped; stamens 4, all fertile, ascending, parallel, upper pair shorter.

SCUTELLARIA. Upper lip of the calyx with a helmet-like appendage.

Tribe **Stachydeae.** Calyx 5–10-nerved, 2-lipped only in Prunella; stamens 4, fertile, parallel, ascending under the upper lip of the corolla; upper pair shorter.

* *Calyx 2-lipped, not membranous, closed in fruit.*

PRUNELLA. Calyx deeply 2-lipped, reticulate veiny.

* * *Calyx 5-toothed, membranous, open in fruit.*

PHYSOSTEGIA. Calyx 5-toothed, inflated in fruit.

* * * *Calyx 5–10-toothed, not membranous, 5–10-nerved.*

† *Naturalized Old World species, growing in waste places.*

MARRUBIUM. Stamens and style included in the tube of the corolla.

LEONURUS. Leaves cleft or incised; calyx-teeth spiny-pointed and spreading when old.

LAMIUM. Leaves mostly cordate; calyx-teeth lanceolate, subulate-pointed.

GALEOPSIS. Stem swollen below the joints; calyx-teeth spinescent; anthers transversely 2-valved.

† † *Native species, growing in damp soil.*

STACHYS. Stamens or only the lower pair often deflexed to the side of the throat of the corolla; nutlets obtuse.

ISANTHUS Mx. Annual, branched, with 3-nerved leaves, and 1–3-flowered axillary peduncles. Calyx campanulate, equally 5-toothed. Corolla equally 5-parted, segments ovate. Stamens 4, but slightly didynamous, incurved, ascending. Ovary deeply 4-lobed.

I. caeruleus Mx. *False Pennyroyal.* Stem 8–18 inches high, pubescent; leaves lance-oblong, nearly entire; flowers small, pale blue; corolla but little longer than the calyx. Dry soil; July–August; frequent; Winneshiek, Scott, Muscatine, Henry, Johnson, and Lyon counties; reported from Fayette county. (*I. brachiatus* (L.) B. S. P.)

Trichostema dichotomum L. Annual, stem 6–20 inches high, viscid-pubescent; leaves oblong or oblong-lanceolate, thin; flowers paniculate; calyx oblique, unequally 5-lobed; corolla blue, pink or white, nearly regular; stamens long-exserted. Reported by Arthur, but the species seems not to have been found by any other collector. As Iowa is out of the range of the species its occurrence may be considered doubtful.

TEUCRIUM L. Perennials. Calyx nearly regular, 5-toothed. Corolla 5-lobed; lower lobe the largest, the upper four nearly equal. Stamens 4, exserted from the deep cleft between the 2 upper petals.

T. canadense L Stem 1–3 feet high, simple, hoary-pubescent; leaves lanceolate, oblong-lanceolate, or ovate-lanceolate, acute, serrate, short-petioled, green above, whitish beneath; bracts linear-lanceolate, about the length of the calyx; flower-whorls crowded into a long spike; calyx canescent, the upper

teeth obtuse; corolla purplish, varying to cream-color. Rich soil; July–September; common.

T. occidentale A. Gray. Similar to the preceding, villous or pubescent; leaves thin, slender petioled; calyx villous, the 3 upper calyx-teeth acute or acutish. Moist soil; July–September. This species occurs near our western and southwestern border and probably belongs to our flora.

MENTHA L. Strong-scented perennial herbs, usually spreading by creeping rootstocks. Flowers small, white or purplish, glomerate. Calyx campanulate, equally 5-toothed. Corolla-tube scarcely exceeding the calyx, limb nearly equally 4-cleft. Stamens 4, erect, distant.

M. canadensis L. *Wild Mint.* Stem 1–2 feet high, simple or branched, hoary-pubescent: leaves ovate-oblong to lanceolate, tapering both ways, petioled, serrate; flower clusters shorter than the petioles; calyx hairy: stamens exserted. Wet soil; July–September; common. This species varies to almost glabrous, with short-petioled leaves, the variety GLABRATA Benth.

M. viridis L. *Spearmint.* A glabrous perennial, 1–2 feet high, with lanceolate sessile or short-petioled serrate leaves, and whorls of small flowers collected into a terminal narrow interrupted spike. Waste places; July–September; infrequent; Muscatine and Taylor counties; reported from Lee county. (*M. spicata* L.)

M. piperita L. *Peppermint.* Perennial, glabrous, 1–3 feet high, with lanceolate petioled serrate leaves, and whorls of flowers in terminal dense or interrupted spikes. Waste places; July–September; reported from Lee county.

LYCOPUS L. Perennials, with sharply toothed or pinnatifid leaves, and small mostly white flowers in dense axillary whorls. Calyx campanulate, 4–5-toothed. Corolla campanulate, but little exceeding the calyx, about equally 4-lobed. Stamens 2, distant.

* *Calyx-teeth mostly 4, ovate, shorter than the nutlets.*

L. virginicus L. *Bugle-weed.* Stoloniferous; stem 1–2 feet high, obtusely 4-angled; leaves ovate or oblong-lanceolate, acuminate both ways, short-petioled, thin, toothed above the base. Moist shady places; July–August: frequent; Johnson, Decatur, and Emmet counties; reported from Fayette, Story, and Woodbury counties.

* * *Calyx-teeth usually 5, lanceolate or subulate, longer than the nutlets.*

† *Bracts very small; corolla twice the length of the calyx.*

L. rubellus Moench. Stoloniferous; stem 1–3 feet high, obtusely 4-angled, somewhat pubescent; leaves ovate-oblong or oblong-lanceolate, sharply serrate in the middle, acuminate both ways, petioled; calyx-teeth 5, acute. Wet soil; July–August; infrequent; Muscatine and Decatur counties; reported from Story county.

† † *Bracts lanceolate or subulate; corolla less than twice the length of the calyx.*

L. sinuatus Ell. Not stoloniferous, perennial by suckers; stem 1–3 feet high, acutely 4-angled, glabrous or minutely pubescent: leaves oblong or lanceolate, acuminate, sinuate, incised or pinnatifid, tapering to a slender petiole, calyx-teeth triangular-subulate and short-cuspidate. Low places; July–September; common. (*L. americanus* Muhl.)

L. lucidus Turcz. Stoloniferous, usually simple, leafy, 1–3 feet high; leaves oblong-lanceolate, sessile or short-petioled, sharply serrate; bracts ovate or lanceolate, acuminate-subulate; calyx-teeth subulate-lanceolate. Wet soil; July–September; forms from Woodbury county have been referred to this species. (*L. lucidus* var. *americanus* A. Gray.)

PYCNANTHEMUM Mx. Perennials, corymbosely branched above, with the flowers in dense capitate heads or cymes. Calyx tubular, striate, equally 5-toothed, or the 3 upper teeth partially united. Corolla 2-lipped; upper lip entire or notched; the lower 3-lobed; lobes all ovate and obtuse. Stamens 4, distant.

P. lanceolatum Pursh. Stem 1–3 feet high, glabrous or somewhat pubescent; leaves lanceolate or linear-lanceolate, sessile or nearly so, entire, nervose-veined, bracts lanceolate or ovate; calyx-teeth ovate-deltoid, acute. Dry soil; July–September; common; Winneshiek, Floyd, Jackson, Hancock, Johnson, Henry, Wapello, Appanoose, Decatur, Ringgold, Winnebago, Cerro Gordo, Dickinson, and Emmet counties; reported from Fayette and Story counties. (*Koellia virginiana* (L.) MacM.)

P. linifolium Pursh. Stem 1–2 feet high, glabrous; leaves linear-lanceolate, somewhat 3-nerved, entire, sessile or the lower short-petioled; heads downy; bracts and calyx-teeth pungently awn-pointed. Dry soil; July–September; frequent; Jackson, Delaware, Muscatine, Louisa, Johnson, Appanoose, Decatur, Ringgold, and Fremont counties; reported from Scott county. (*Koellia flexuosa* (Walt.) MacM.)

P. pilosum Nutt. Stem 1–3 feet high, hirsute or pilose; leaves lanceolate, sessile or short-petioled, mostly entire; glomerules dense, terminal, hirsute-canescent or villous; bracts lanceolate; calyx-teeth lanceolate-subulate. Dry sandy soil; July–September; reported from Muscatine, Lee, Linn, and Des Moines counties.

HEDEOMA Pers. Small odorous annuals, with small opposite leaves, and small blue or purple flowers in axillary clusters, collectively in leafy racemes. Calyx 13-nerved, gibbous at the base, bearded in the throat, 2-lipped; upper lip 3-toothed; lower 2-cleft. Corolla 2-lipped; upper lip erect, notched; lower spreading, 3-cleft. Stamens 2, fertile, sometimes 2 sterile stamens on the upper side.

H. pulegioides (L.) Pers. *American Pennyroyal.* Stem 6–12 inches high, erect, branching, pubescent; leaves petioled, oblong-obovate, somewhat, serrate or entire; whorls about 6-flowered; calyx-teeth of the upper lip triangular; corolla bluish; sterile filaments present. Open upland woods; June–August; frequent; Muscatine, Louisa, Des Moines, Lee, Van Buren, Henry, Johnson, Cerro Gordo, Decatur, Page, Calhoun, Fremont, and Lyon counties; reported from Fayette and Story counties.

H. hispida Pursh. Stem 2–5 inches high, branching, pubescent; leaves sessile, linear, obtuse, entire; whorls about 6-flowered; calyx-teeth subulate; corolla bluish; sterile filaments minute or wanting. Dry soil; June–July; common; Winneshiek, Fayette, Jones, Muscatine, Linn, Johnson, Decatur, and Lyon counties; reported from Story and Woodbury counties.

SALVIA L. SAGE. Calyx striate, 2-lipped; the upper lip 3-toothed or entire; lower 2-cleft; throat naked. Corolla 2-lipped, ringent; upper lip straight or scythe-shaped, entire or slightly notched; lower pendant or spreading, 3-lobed. Stamens 2; anther-cells widely separated, connective transverse.

S. lanceolata Willd. Annual; stem 4–14 inches high, simple or branched, puberulent or somewhat glabrous; leaves linear-oblong or lanceolate, obtuse, entire or crenulate-dentate, slender petioled; inflorescence in spike-like racemes; calyx strongly nerved, upper lip entire, lower 2-cleft, teeth ovate, mucronate-acute; corolla blue, but little exceeding the calyx. Dry soil,

prairies; June–August; frequent in western Iowa; Page, Shelby, Fremont, Polk, and Decatur counties; reported from Pottawattamie, Harrison, Story, Fayette, and Muscatine counties.

S. pitcheri Torr. Perennial; stem 2–5 feet high, branched; leaves linear or linear-oblong, sessile or short-petioled, entire or dentate; corolla-tube exserted. Forms from Muscatine county have been referred to this western species. (*S. azurea* var. *grandiflora* Benth.)

S. officinalis L. Shrubby; leaves lance-oblong, crenulate. This is the garden sage; reported as an escape from Fayette county.

MONARDA L. Ours erect perennials, with entire or toothed leaves, and conspicuous flowers in bracted heads. Calyx elongated, cylindric, about 15-nerved, nearly equally 5-toothed, throat usually hairy. Corolla tubular, elongated, strongly 2-lipped; upper lip linear, erect, entire or but little notched; lower spreading or reflexed, 3-lobed. Stamens 2, ascending beneath the upper lip, inserted on the throat of the corolla.

M. fistulosa L. *Wild Bergamot.* Stem 2–4 feet high, glabrate to soft-pubescent, branched above; leaves ovate-lanceolate, acuminate, serrate, petioled; heads solitary, terminal; calyx a little curved, hairy in the throat; corolla exserted, 1–2 inches long, greenish-white, purple or purplish-dotted, upper lip pubescent, linear, acute; stamens and style exserted from under the upper lip. Prairies and open woods; June–September; common.

M. punctata L. *Horse-Mint.* Stem 2–3 feet high, whitish-downy; leaves lanceolate, somewhat serrate, petioled, downy beneath; floral bracts yellowish and purplish, sessile, longer than the flowers; heads axillary and terminal; calyx-teeth short, rigid, soon spreading; corolla smoothish, yellowish, upper lip purple-spotted. Sandy soil; July–September; infrequent; Dubuque, Muscatine, Louisa, Des Moines, Cedar, Johnson, Linn, and Jefferson counties.

BLEPHILIA Raf. Perennials, with small purplish or bluish flowers in dense axillary or terminal globose heads. Calyx 2-lipped, 13-nerved; upper lip 3-toothed, lower 2-toothed. Corolla about equally 2-lipped, throat inflated; upper lip short, erect, entire; lower spreading, unequally 3-cleft. Stamens 2, ascending, exserted.

B. hirsuta (Pursh) Torr. Whole plant hairy; stem 1–3 feet high, widely branched; leaves ovate or ovate-lanceolate, acuminate, base rounded or subcordate, rather long-petioled, slightly serrate; bracts lanceolate to linear-lanceolate; calyx hairy; corolla pale, a little pubescent, purple-spotted. Rich woods; June–August; infrequent; Winneshiek, Jones, Jackson, Johnson, Henry, and Dickinson counties; reported from Fayette and Story counties.

B. ciliata (L.) Raf. Stem 1–2 feet high, simple or branched, downy; leaves lanceolate or oblong-lanceolate, obtuse, obscurely serrate, short-petioled or the upper sessile; leaves of the sterile shoots, ovate or oval, slender-petioled, crenate-denticulate; outer bracts ovate, acute, colored, ciliate; corolla hairy. Dry woods; June–August; infrequent; Henry county.

LOPHANTHUS Benth. Erect perennials, with serrate petioled leaves, and small flowers in dense sessile glomerules which are collected into continuous or interrupted spikes. Floral leaves of short ovate acuminate bracts. Calyx oblique, 15-nerved, 5-toothed, upper teeth longer. Corolla 2-lipped; upper lip nearly erect, 2-lobed; lower spreading, 3-lobed, middle lobe crenate. Stamens 4, exserted; upper pair declined; lower pair shorter, ascending, surpassing the upper pair.

L. scrophulariaefolius (Willd.) Benth. *Giant-Hyssop.* Stem 3–6 feet high, obtusely 4-angled, pubescent; leaves ovate or ovate-oblong, acuminate, base cordate, more or less pubescent; calyx-teeth lanceolate, acute; corolla conspicuous, purplish; spikes mostly interrupted. Open woods; July–September; frequent; Winneshiek, Johnson, Henry, Appanoose, Decatur, Fremont, Story, Winnebago, Dickinson, and Emmet counties; reported from Fayette, Muscatine, Hamilton, and Woodbury counties. (*Agastache scrophulariaefolia* (Willd.) Kuntze.)

L. nepetoides (L.) Benth. Stem 3–6 feet high, sharply 4-angular, glabrous or slightly puberulent; leaves ovate or ovate-oblong, acuminate, crenate-serrate, base cordate; spikes linear, cylindrical, continuous; bracts many, ovate, acute; calyx-teeth ovate, obtuse; corolla inconspicuous, pale greenish-yellow. Open woods; July–August; less frequent than the preceding which it closely resembles; Winneshiek, Des Moines, Johnson, Henry, Van Buren, Decatur, Ringgold, Page, Fremont, Story, and Emmet counties; reported from Fayette and Scott counties. (*Agastache nepetoides* (L.) Kuntze.)

NEPETA L. Perennials. Calyx tubular, obliquely 3-toothed, 15-nerved. Corolla 2-lipped; upper lip emarginate or 2-lobed; lower spreading, 3-cleft, the middle lobe the largest, 2-lobed or entire; throat dilated. Stamens 4, ascending, not exserted, lower pair shorter.

N. cataria L. *Catnep. Catmint.* Stem 2–3 feet high, erect, branched, downy; leaves ovate to oblong, coarsely crenate, whitish downy beneath, base cordate; floral leaves small and bract-like; flowers in cymose clusters which are collected into interrupted spikes or racemes; corolla whitish, dotted with purple. Waste places; July–September; common.

N. glechoma Benth. *Ground Ivy. Gill-over-the-ground.* Stems procumbent or creeping, somewhat pubescent or glabrous; leaves all alike, long-petioled, reniform, coarsely crenate, green on both sides; flowers 2–3 in the axils of the leaves; corolla light blue, twice the length of the calyx. Waste places near dwellings; April–June; frequent. (*Glecoma hederacea* L.)

DRACOCEPHALUM L. Perennials, with serrate or incised leaves, and blue or purple flowers in axillary and terminal bracted clusters. Calyx tubular, 15-nerved, 5-toothed in ours, the upper tooth the largest. Corolla 2-lipped; the upper lip emarginate; lower lip 3-lobed. Stamens 4, didynamous.

D. parviflorum Nutt. Annual or biennial, glabrous or somewhat pubescent, 6–20 inches high; leaves ovate, oblong, or lanceolate, petioled; flowers in dense terminal spikes or in the upper axils; corolla but little exceeding the calyx, light blue. Sterile soil; May–August; reported from Iowa by Arthur. The species probably occurs near our northern border.

SCUTELLARIA L. Skullcap. Perennials, not aromatic, with axillary opposite solitary or racemose flowers. Calyx campanulate, 2-lipped, closed after flowering; lips entire, the upper with a helmet-like appendage. Corolla 2-lipped; upper lip arched, entire or slightly notched; lower lip spreading, notched; lateral lobes more connected with the upper lip, tube long-exserted, throat dilated. Stamens 4, ascending beneath the upper lip; anthers ciliate or bearded; lower 1-celled, upper 2-celled. Nutlets rough-granulate.

S. versicolor Nutt. Stem 1–3 feet high, erect, soft-pubescent; leaves ovate, cordate, petioled, obtuse, crenate-toothed, rugose; the floral bracts ovate, entire; flowers rather large, in terminal simple racemes; corolla-lips nearly equal, upper bright blue, lower whitish, lateral lobes distinct. Rich woods; June–July; frequent; Winneshiek, Allamakee, Louisa, Des Moines,

Lee, Henry, Johnson, Van Buren, and Decatur counties; reported from Fayette, Scott, and Muscatine counties. (*S. cordifolia* Muhl.)

S. parvula Mx. Stem erect, 3–10 inches high, glabrous or pubescent, branching from the base, filiform subterranean stolons bearing a string of tubers; leaves ovate or ovate-lanceolate, sessile by a slightly cordate or truncate base, lower petioled, obtuse, entire or obscurely toothed; flowers solitary axillary, pedicelled; corolla violet, pubescent, 2–3 times the length of the calyx. Sandy prairies; May–June; frequent throughout the state; Winneshiek, Allamakee, Scott, Henry, Wapello, Johnson, Appanoose, Wayne, Decatur, Ringgold, Pottawattamie, Shelby, Chickasaw, Emmet, and Lyon counties; reported from Fayette, Muscatine, Story, and Woodbury counties.

S. galericulata L. Stem 1–3 feet high, erect, glabrous or slightly pubescent, simple or branched; leaves ovate-lanceolate or oblong-lanceolate, thin, acute, serrate or nearly entire, sessile or short-petioled, base slightly cordate; flowers few, rather large, short-pedicelled, axillary; corolla blue. Wet places; July–August; infrequent; Fayette, Story, Emmet, Hancock, Winnebago, and Cerro Gordo counties; reported from Scott and Hamilton counties.

S. lateriflora L. *Mad-dog Skullcap.* Stem 1–3 feet high, glabrous, much branched; leaves thin, ovate-lanceolate or oblong-ovate, long-petioled, acuminate, coarsely serrate, base rounded, the lower floral leaves similar; flowers small, in axillary or terminal small 1-sided racemes; corolla blue, rarely white, lips short and equal. Moist places; July–August; frequent and widely distributed; Winneshiek, Jackson, Muscatine, Louisa, Lee, Johnson, Story, Appanoose, Decatur, Winnebago, Emmet, and Lyon counties; reported from Fayette, Scott, Monona, and Woodbury counties.

PRUNELLA L. Perennial herbs, with simple or branched stems, and 3-flowered sessile axillary clusters collected into terminal heads or spikes. Calyx tubular, about 10-nerved, 2-lipped; upper lip 3-toothed; lower 2-cleft. Corolla ascending, 2-lipped; upper lip erect, arched, entire; lower reflexed-spreading, 3-cleft, middle lobe denticulate. Stamens 4; filaments 2-toothed, the 2-celled anther on the lower tooth. Usually spelled *Brunella*.

B. vulgaris L. *Self-heal.* Stem 1–2 feet high, glabrous; leaves ovate, oblong or oblong-lanceolate, entire or toothed, petioled; floral bracts round-ovate, nervose, pointed, spikes dense, oblong-ovoid; calyx purplish; corolla longer, violet to purplish. Open upland woods; June–September; common.

PHYSOSTEGIA Benth. Glabrous erect perennials, with sessile lanceolate serrate leaves, and large showy rose-colored or purplish flowers in leafless terminal spikes. Calyx campanulate, about equally 5-toothed. Corolla exserted, funnelform, throat inflated, 2-lipped; upper lip erect, entire; lower spreading, 3-lobed, middle lobe notched. Stamens 4.

P. virginiana (L.) Benth. *False Dragon-head.* Stem 1–4 feet high; spikes terminal, solitary or panicled; flowers opposite, in the axils of small bracts. Moist woods; August–September; frequent; Winneshiek, Jones, Linn, Johnson, Des Moines, Decatur, Fremont, Story, Winnebago, and Lyon counties; reported from Fayette, Muscatine, and Woodbury counties.

MARRUBIUM L. Ours a white-woolly aromatic perennial, with petioled round-ovate crenate leaves, and the many flowers in remote axillary whorls. Calyx tubular, 5–10-ribbed, nearly equally 5–10-toothed. Corolla 2-lipped; upper lip erect, notched; lower spreading, 3-cleft. Stamens 4, included.

M. vulgare L. *White Hoarhound.* An Old World species, escaped from gardens into waste places; Fremont county; reported from Fayette and Jackson counties.

LEONURUS L. Ours a perennial. Flowers in close axillary whorls. Calyx 5-nerved, with 5 spine-tipped teeth. Corolla 2-lipped; upper oblong, arched, entire; lower spreading, 3-lobed. Stamens 4, ascending under the upper lip. Nutlets truncate, 3-angled.

L. cardiaca L. *Motherwort.* Stem 2–5 feet high, more or less pubescent; leaves petioled, palmately 3–5-cleft, lobes cut-toothed or incised, base cuneate to cordate; corolla purple, pink or white, upper lip bearded. Waste places near dwellings; June–September; frequent in the eastern counties; Winneshiek, Johnson, Des Moines, Appanoose, Decatur, and Fremont counties; reported from Fayette, Scott, Muscatine, and Story counties.

LAMIUM L. A decumbent herb, with mostly cordate incised or doubly-toothed long-petioled or sessile leaves, and small purplish flowers in axillary clusters. Calyx 5-nerved, 5-toothed, awl-pointed. Corolla dilated in the throat, 2-lipped; upper lip oblong, arched, galeate; lower spreading, 3-lobed, middle lobe emarginate. Nutlets truncate at the apex.

L. amplexicaule L. *Dead-Nettle.* An Old World weed reported from Lee county.

GALEOPSIS L. Annual, with spreading branches, and many-flowered axillary whorls. Calyx tubular-campanulate, 5-nerved, 5-toothed, spinescent. Corolla 2-lipped, throat dilated; upper lip arched, nearly entire; lower spreading, 3-cleft, middle lobe obcordate, palate with 2 teeth at the sinuses. Stamens 4, ascending under the upper lip, exserted.

G. tetrahit L. *Hemp-Nettle.* Stem 1–3 feet high, hispid, swollen below the joints; leaves ovate, thin, acuminate, coarsely serrate, petioled; corolla purplish, twice the length of the calyx. Waste places; June–September; infrequent; Winneshiek county.

STACHYS L. Hedge-Nettle. Ours perennials, with the whorls 2–many-flowered, collected into a terminal raceme or spike. Calyx tubular-campanulate, 5–10-nerved, 5-toothed. Corolla 2-lipped; upper lip arched, entire, pubescent; lower spreading, 3-lobed; throat not dilated. Stamens 4, ascending, often deflexed to the sides of the throat. Nutlets obtuse.

S. aspera Mx. Stem 1–4 feet high, retrorsely hispid to nearly glabrous; leaves thin, oblong-ovate to oblong-lanceolate, acuminate, obtusely serrate, distinctly petioled; flowers in a slender interrupted spike; calyx glabrous or with a few bristles; corolla red-purple. Low places; July–September; common; Winneshiek, Johnson, Henry, Union, Montgomery, and Shelby counties; reported from Fayette, Story, Emmet, Sioux, and Woodbury counties.

S. palustris L. Stem 1–4 feet high, densely hirsute with spreading or reflexed hairs or roughish-hirsute on the angles; leaves ovate-lanceolate to oblong-lanceolate, crenate-serrate, acuminate, sessile or short-petioled, hairy or pubescent especially beneath; calyx pubescent or hirsute. Low places; June–August; frequent; Dubuque, Jackson, Johnson, Appanoose; Decatur, Ringgold, and Story counties; reported from Fayette and Scott counties.

PLANTAGINACEAE *Lindl.* Plantain Family.

Low herbs, with radical leaves, and regular 4-merous flowers in scapose spikes. Stamens 4, inserted on the corolla-tube and alternate with its lobes, exserted or sometimes included. Ovary free, 2–4-celled. Fruit a membranous capsule.

PLANTAGO L. Plantain. Annuals or perennials with ribbed leaves. Calyx of 4 membranous imbricated persistent sepals. Corolla withering-per-

sistent, 4-parted, scarious. Stamens 4 or rarely 2. Ovary 2-celled, rarely 3-4-celled. Capsule in ours 2-celled, circumscissile, with one to several seeds in each cell.

P. rugelii Decaisne. Leaves ovate to oblong, thinnish, pale, smooth, base of the petioles purple; spike 1–2 feet long, apex attenuated and sometimes branched; capsule acutish, line of dehiscence much below the middle and hidden by the calyx; seeds oval-oblong, not reticulated. Moist soil; June–September; common.

P. major L. *Common P.* Leaves similar to the preceding but thicker, often pubescent, base of the petioles green, spike 4–6 inches long, obtuse, densely flowered; capsule ovate, obtuse, line of dehiscence near the middle above the calyx; seeds angled, reticulated. Waste places near dwellings; June–September; less common than the preceding.

P. lanceolata L. *English P.* Biennial or perennial; leaves narrowly oblong-lanceolate, acuminate both ways; scape angled, longer than the leaves; spike ovate or cylindric; bracts and sepals scarious, brownish. Waste places, streets; May–September; infrequent; Decatur county; reported from Story, Fayette, and Van Buren counties.

P. aristata Mx. Annual, loosely villous or glabrate; leaves narrowly lanceolate to linear, green; bracts conspicuous, narrowly attenuate, more than twice the length of the flowers; spike dense, cylindrical or oblong; sepals oblong, obtuse, scarious-margined; corolla-lobes spreading, broadly ovate. Prairies and waste places; May–September; common and spreading; Decatur, Appanoose, Van Buren, Lee, Henry, Muscatine, Winneshiek, Calhoun, Ringgold, Montgomery, and Pottawattamie counties; reported from Story county. (*P. patagonica* var. *aristata* Gray.)

P. gnaphalioides Nutt. Annual, canescently villous, the wool often floccose and deciduous; leaves linear; bracts inconspicuous, oblong or linear-lanceolate, scarcely longer than the calyx; flowers similar to those of the preceding species. Waste places; May–August; infrequent; Lyon, Emmet, Bremer, and Fremont counties; reported from Sioux, Humbolt, and Fayette, counties. (*P. purshii* R. & S. *P. patagonica* var. *gnaphalioides* Gray.)

P. virginica L. Winter annual or a fibrous-rooted biennial, soft-pubescent or hairy; leaves spatulate or obovate-oblong, entire or repand-denticulate, 3–5-nerved, short-petioled or nearly sessile; scape 2–8 inches high; spike rather dense, 2–4 inches long; capsule usually 2–4-seeded. Sandy soil; May–September; infrequent; Muscatine and Lee counties.

APPENDIX.

Atragene americana Sims. *Purple Virgin's Bower.* Perennial trailing or twining vine, with opposite petioled trifoliolate leaves, and large solitary axillary flowers; leaflets ovate, acute, entire or toothed, somewhat cordate; sepals large, purplish blue; petals small, spatulate; stamens many; styles persistent, plumose. Open rocky woods; May–June; rare; Winneshiek county. (*Clematis verticillaris* DC.)

Nelumbo lutea (Willd.) Pers., **Didiplis linearis** Raf., and **Ammannia coccinea** Rottb. were collected in Appanoose county during the season of 1899.

Myriophyllum scabratum Mx. Decatur county.

Rhamnus alnifolia L'Her. and **Rubus triflorus** Richard, were received from Winneshiek county.

Tribulus terrestris L. A pubescent prostrate or ascending annual, with pinnate petioled stipulate leaves, and solitary peduncled flowers. Stamens 10. Fruit 5-angled, spiny, splitting into 5 3–5-angled segments. An introduced plant belonging to the caltrop family. (ZYGOPHYLLACEAE *Lindl.*) Reported as occuring near Fruitland, Muscatine county by Prof. Pammel.

Prunus chicasa Mx. *Chickasaw Plum.* A small tree; leaves lanceolate or oblong-lanceolate, acute, serrulate; flowers small, in lateral umbels; drupe red, thin-skinned. Reported from Dubuque (Macbride) and Muscatine (Reppert) counties. (*P. angustifolia* Mx.)

Viburnum pubescens petiolum n. var. A low shrub, 3–5 feet high, with slender grayish branches, opposite leaves, and cymose flowers. The leaves are broadly oval to nearly orbicular, acuminate, sharply and somewhat irregularly dentate, velvety-pubescent beneath, glabrous above, base cordate, petioles one-half an inch to an inch in length; fruit oblong or oblong-oval, 3–4-tenths of an inch long by 2-tenths of an inch wide; stone mostly plane on one side and convex on the other, two-grooved on both surfaces. Rocky woods; May, fruit ripe in September; infrequent; Johnson and Jefferson counties.

Viburnum prunifolium L. and **Sambucus racemosa** L. Reported from Dubuque county.

Sicyos angulatus L. Decatur county

Apocynum pubescens R. Br. Decatur county, one specimen collected in July, 1897.

Conringia perfoliata Link. An erect glabrous annual herb; stem 1–3 feet high; leaves elliptic or ovate, entire, sessile and cordate; flowers yellowish white, racemose; siliques long-linear, angled, valves 1–3-nerved; seeds in 1 row in each cell. Waste places, introduced; reported from Lyon and Story counties. (CRUCIFERAE.) (*C. orientalis* (L.) Dumort.)

Vicia sativa L. Annual, pubescent or glabrate; spreading, ascending or climbing; stem 1–3 feet long; stipules broad, toothed; leaflets varying from obovate to oblong or oblanceolate, apex obtuse, truncate or retuse, mucronate; flowers bluish-purple, 1 or 2 in the axils; pod linear-oblong, glabrous. Waste places; May–August; infrequent; Winneshiek county.

Cornus circinata L'Her. Reported from Dubuque and Muscatine counties.

January 1, 1900.

ACANTHACEAE 129
Acanthus Family 129
Acerates 109
Achilleia 91
Actinomeris 89
Adopogon 97
Adoxa 69
ADOXACEAE 69
Afzelia 126
Agastache 136
Ajugoideae 131
Ambrosia 96
AMBROSIACEAE 95
Ammannia 139
Anagalis 105
Anaphalis 83
Androsace 104
Antennaria 83
Anthemis 91
Anthemideae 73
Artichoke 89
Antirrhineae 120
Antirrhinideae 120
Aphyllon 127
Aplopappus 76
APOCYNACEAE 106
Apocynum 107, 140
Appendix 140
Apple-of-Peru 120
Arctium 94
Arrow-wood 69
Artemisia 92
ASCLEPIADACEAE 107
Asclepias 107
Ash 106
Aster 79–82
Astereae 72
Atragene 139

Beard-tongue 122
Bedstraw 71
Beggar-ticks 90
Bell-flower 101
Bell-flower Family 101
Bergamot, Wild 135
Bidens 90
BIGNONIACEAE 128
Bindweed 115
Black-eyed Susan 86
Bladderwort 128
Bladderwort Family 128
Blazing-Star 75
Blephilia 135
Blue-bells 114
Bluets, Least 70
Blueweed 115
Boltonia 78
Boneset 75
Borage Family 112
BORRAGINACEAE 112
Brauneria 86
Breweria 116
Broom-rape 127
Broom-rape Family 127
Brown-eyed Susan 86
Buckbean 110
Bugle-weed 133
Butter and eggs 121
Button-bush 70

Cacalia 94
Campanula 101
CAMPANULACEAE 101
CAPRIFOLIACEAE 67
Cardinal-flower 102
Carduus 95
Castilleja 126
Catalpa 128, 129
Catawba Tree 128
Catnep 136
Catmint 136
Cephalanthus 70
Chamomile, Corn 91
Chelone 122
Cheloneae 120
Chicory 97
Chicory Family 97
Chimaphila 103
Chrysanthum 91
Chrysopsis 76
CICHORIACEAE 97
Cichorium 97
Chickasaw Plum 140
Clematis 140
Cnicus 95
Cocklebur 96
Collinsia 123
Collomia 111
Compass-plant 84
COMPOSITAE 72
Cone-flower 86
Conobea 123
Convolvulaceae 115
Convolvulus 115
Coral berry 67
Coreopsis 89, 90
Coringia 140
Corn Speedwell 124
Cornus 140
Corpse-plant 103
Cowslip, Virginia 114
Cow-Wheat 127
Cranberry-tree 69
CRUCIFERAE 140
Culver's-root 124
Cup-plant 85
Cuscuta 116, 117
CUSCUTACEAE 116
Cynareae 74
Cynoglossum 112

Daisy, Ox-eye 92
Daisy, White 92
Dasystoma 125
Datura 120
Dead-Nettle 138
Dianthera 129
Didiplis 139
Diervilla 68
Digitaleae 121
Diospyros 105
Dodder Family 116
Dodecatheon 104
Doellingeria 83
Dogbane 107
Dogbane Family 106
Dog-fennel 91
Dracocephalum 136
Dragon-head, False 137
Dysodia 91

EBENACEAE 105
Ebony Family 105
Echinacea 86
Echinospermum 113
Echium 115
Eclipta 85
Elder, Common 68
  Red-berried 68
  Marsh 96
Elecampane 84
Ellisa 112
English Plantain 134
Euthamia 78
Erechtites 94
Erigeron 83
Eriocarpum 76
Eupatorium 74
Euphrasieae 121

Fever-wort 67
Figwort 122
Figwort Family 120
Fireweed 94
Fleabane 83
Fog-fruit 131
Fraxinus 106

Galeopsis 138
Galium 70, 71
Gaylussacia 104
Gentian 109
Gentiana 109
GENTIANACEAE 109
Gentian Family 109
Gerardia 125
Gerardieae 121
Giant-Hyssop 136
Gilia 111
Gill-over-the-ground 136
Gnaphalium 84
Goat's-beard 98
Golden-rod 77
Gratioleae 121
Gratiola 123
Grindelia 76
Ground Cherry 118
Ground Ivy 136
Ground Pink 111
Gromwell 114
Guelder-rose, Wild 69

Harebell 101
Haw, Black 69
Hawkweed 98
Hedeoma 134
Hedge-Nettle 138
Helenieae 73
Helenium 91
Heliantheae 73
Helianthus 87, 88, 89
Heliopsis 85
Hemp-Nettle 138
Herpestis 123
Hieracium 98
Hoarhound 137
Honeysuckle 68
Bush 68
Honeysuckle Family 67
Horse Gentian 67
Horse-Mint 135
Horse-Nettle 118
Horse-weed 83
Hound's Tongue 113
Houstonia 70
HYDROPHYLLACEAE 111
Hydrophyllum 111
Huckleberry 104
Huckleberry Family 103

Ilysanthes 124
Indian Bean 128, 129
Indian Currant 67
Indian Hemp 107
Indian Pipe 103
Inula 84
Inuleae 73
Ipomoea 116
Iva 96
Iron-weed 74
Isanthus 132

Jimson-weed 120
Joe-Pye Weed 74

Koellia 134
Krigia 97
Kuhnia 75

LABIATAE 131
Lacinaria 76
Lactuca 99, 100
Lamium 138
Lappula 113
Legouzia 102
LENTIBULARIACEAE 128
Leonurus 138
Lepachys 86
Leptilon 83
Liatris 75
LIGULIFLORAE 97
Lilac 106
Linaria 121
Linnaea 67
Lippia 131
Liquorice, Wild 70
Lithospermum 114
Lobelia 102
Lonicera 68
Lonicereae 67
Lophanthus 135
Lopseed 131
Lousewort 126
Lungwort 114
Lycium 120
Lycopersicum 120
Lycopus 133
Lygodesmia 99
Lysimachia 105

Madder Family 70
Marigold, Fetid 91
Marigold, Water 91
Martynia 129
MARTYNIACEAE 129
Marrubium 137
Matrimony Vine 120
Mayweed 91
Melampyrum 127
Mentha 133
MENYANTHACEAE 110
Menyanthes 110
Mertensia 113
Mesadenia 94
Milfoil 91
Milkweek 107, 108
Milkweed Family 107
Milkweeds, Green 109
Mimulus 123
Mint Family 131
Mint, Wild 133
Mist-flower 75
Macrocalyx 112
Monarda 135
Monardeae 132
Monkey-flower 123
Monniera 123
Monotropa 103
MONOTROPACEAE 103
Morning Glory 116
Morning-glory Family 115
Moschatel 69
Moscatel Family 69
Moss Pink 111
Motherwort 138
Mullein 121
Mullein Foxglove 126
Musk-root 69
Myosotis 113
Myriophyllum 139

Nabalus 98
Naumburgia 105
Nepeta 136
Nepeteae 132
Nelumbo 139
Nicandra 119
Nightshade 118
Nothocalais 99

OLEACEAE 106
Olive Family 106
Onosmodium 115
Orobanche 127
OROBANCHACEAE 127
Ox-eye, Rough 85
Oyster-plant 98

Parthenium 85
Pedicularis 126
Pennyroyal, American 134
Pennyroyal, False 132
Pentstemon 122
Peppermint 133
Persimmon 105
Phlox 110
Phlox Family 110
Phryma 131
Physalis 118
Physostegia 137
PLATAGINACEAE 138
Plantago 138
Plantain 138
Plantain Family 138
POLEMONIACEAE 110
Polemonium 111
Potato 118
Potato Family 117
Polymnia 84
Prairie Dock 85
Prenanthes 98
PRIMULACEAE 104
Prunella 137
Prunus 140
Puccoon 114
Pycnanthemum 134
Pyrola 103
PYROLACEAE 103

Ragweed 96
Ragwort, Golden 93
Ratibida 87
Rhamnus 139
Rhinanthideae 121
Robin's Plantain 83
Rosin-weed 84
RUBIACEAE 70
Rubus 139
Rudbeckia 86
Ruellia 129

Sage 134
Salvia 134
Sand Bur 118
Sambuceae 67
Sambucus 68, 140
Satureineae 131
Scrophularia 122
SCROPHULARIACEAE 120
Scutellaria 136
Scutellarineae 132
Self-heal 137
Senecio 93
Senecioneae 74

Seymeria 126
Sheep-berry 69
Shin-leaf 103
Shooting Star 104
Sicyos 140
Silphium 84
Skullcap 136
Mad-dog 137
Snakeroot, Button 75
Sneezeweed 91
SOLANACEAE 117
Solanum 118
Solidago 77, 78
Sonchus 101
Spearmint 133
Specularia 101
Speedwell 124
Stachydeae 132
Stachys 138
Steironema 104
Sunflower 87
Symphoricarpos 67
Synosma 94
Synthyris 125
Syringa 106

Tanacetum 92
Tansy 92
Taraxacum 99
Tecoma 128
Teucrium 132
Thalesia 127
Thistle 95
Thistle Family 72
Thorn-Apple 120
Tickseed 89
Tobacco, Indian 102
Tomato 120
Tragopogon 97
Tragopogon 98
Tribulus 140
Trichostema 132
Triosteum 67
Troximon 99
Trumpet Creeper 128
Trumpet Creeper Family 128
Turtle-head 122

Unicorn-Plant 129
Unicorn-plant Family 129
Utricularia 128

VACCINIACEAE 103
Vaccinium 104
Valerian 71
Valeriana 71
VALERIANACEAE 71
Valerianella 72
Venus Looking-glass 102
Verbasceae 120
Verbascum 121
Verbena 130
VERBENACEAE 130
Verbesina 89
Veronica 124
Vernonia 74
Vernonieae 72
Vervain 130
Vervain Family 130
Viburnum 69, 140
Sweet 69
Vicia 140
Viper's Bugloss 115
Virginia Cowslip 114
Virgin's Bower 139

Water-leaf 111
Water-leaf Family 111
Water Speedwell 124
White Hoarhound 137
White Snake-root 75
Wild Mint 133
Wintergreen Family 102
Wolfberry 67
Wormwood 92
Wulfenia 125

Xanthium 96

Yarrow 91

ZYGOPHYLLACEAE 140

ERRATA.

Page 68, lines 5, 10, and 22 for Pottawattomie read Pottawattamie. The same mistake occurs several times in Part 1.

Page 74, last line for gounds read grounds.

Page 90, line 27 for *D. connata* read *B. connata*.

Page 98, line 15 for lowers read flowers.

Page 113, line 38 for Myosotus read Myosotis.

Page 127, line 7 for Decatus read Decatur.